DOCUMENT RESUME

ED 250 845 EC 170 879

TITLE	Early Intervention Research Institute: Final Report, 1982-83 Work Scope.
INSTITUTION	Utah State Univ., Logan. Exceptional Child Center.
SPONS AGENCY	Department of Education, Washington, DC.
PUB DATE	11 Nov 83
NOTE	460p.; The study was conducted at the Early Intervention Research Institute. Parts of the document have small and variable print.
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF01/PC19 Plus Postage.
DESCRIPTORS	*Cost Effectiveness; *Disabilities; Hearing Impairments; *Intervention; Longitudinal Studies; Mental Retardation; Meta Analysis; *Program Effectiveness; Program Evaluation; Young Children

ABSTRACT

The report examines three major research thrusts of the Early Intervention Research Institute at Utah State University. First, meta analysis, a procedure used to review and integrate results of 156 studies (1937-1983) on the efficacy of early intervention with handicapped, at-risk, or disadvantaged children, is evaluated and its needs established. Among tentative conclusions offered as a result of the review are that intervention programs do result in moderately large immediate benefits for handicapped and disadvantaged populations; the more highly structured programs are directly associated with more effective outcomes; certified primary intervenors are substantially more effective than noncertified intervenors; and that for disadvantaged populations, the immediate benefits of early intervention decline rapidly up to about 36 months after the intervention is completed. Results were not clear-cut as to whether or not involving parents in intervention programs is effective. The second major research effort was directed to analysis of cost effectiveness for half day versus full day programs for communicatively and mentally disabled children. An economic model for cost analysis is proposed and its use illustrated. The third research activity described is a longitudinal study of early intervention with hearing impaired students. Among findings was that hearing impaired Ss who received early home intervention perfomed better than late intervention Ss on communication/language skills in relationship to academic skills. Additional chapters describe disseminative activities, the functions of the advisory committee, research training for graduate/research assistants, and project management. (CL)

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FINAL REPORT

1982-83 WORK SCOPE

Utah State University

EARLY INTERVENTION RESEARCH INSTITUTE

November 11, 1983

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CHAPTER I

INTRODUCTION

The Early Intervention Research Institute (EIRI) at Utah State University was funded on October 1, 1982 by the U.S. Department of Education to undertake a five-year program of research in the area of the efficacy and cost effectiveness of early intervention for handicapped preschool children. As outlined in RFP 82-040, the research program had a specific purpose:

> The purpose of this research program is to investigate the effectiveness and associated costs of early education and related services for infants and children with different kinds and severities of handicapping conditions. Research should also address the optimal duration and intensity of educational services for children and families having significantly different characteristics. A research program in this priority area should include the collection of original (new) research data and the analysis of research data already reported in the professional literature. Further, new data collection should be aimed at handicapped populations for which few or no cost or efficacy data are available.

In their proposal, staff at the Exceptional Child Center noted the massive resources being devoted to conducting early intervention programs and to conducting research about the efficacy of those programs. Unfortunately, the evidence for effectiveness was equivocal and an effective integration of existing knowledge was needed. In addition, two main problems in determining the costs of early intervention were noted: first, the failure to consider all sources of costs of intervention programs, and second, the failure to consider effects in relation to costs.

To address the problems resulting from failures to integrate the results of previous research, an integrative review of the early intervention research literature was proposed to serve as a basis for designing needed efficacy studies.

The techniques proposed to conduct this review were first developed by Gene Glass (1976) and are referred to as "meta-analysis". Briefly described, conducting a meta-analysis requires the location of either all studies or a representative sample of studies on a given topic, converting the results or outcomes of the studies to a common metric, coding the various characteristics of studies that might have affected the results, and then using correlational and descriptive statistical techniques (both univariate and multivariate) to summarize study outcomes in a way that allows the examination of covariation of study characteristics with outcomes. Since its introduction, the meta-analysis approach has been used to review and integrate research findings on a wide variety of topics including the relationship of class size to achievement (Glass & Smith, 1979), the relation of socioeconomic status and academic achievement (White, 1982), the efficacy of stimulant drugs for treating hyperactivity (Kavale, 1980; White & Myette, 1982), the effectiveness of training and reinforcement on standardized test results (Taylor & White, 1981), and the effectiveness of sensorimotor training with handicapped children (Kavale, 1981). In all, over 100 meta-analyses studies have been completed and reported. Although not all previous meta-analyses have been well done, it is clear that the meta-analysis techniques are being accepted as a useful methodology by substantial numbers of professionals.

The second major focus of the Institute was to conduct research concerning the cost effectiveness of early intervention (i.e., how much does it cost for a program to result in a specified level of effect?). Two requirements for a good cost-effectiveness analysis were identified: (1) decision alternatives must exist, and (2) a cost analysis must accompany an effectiveness evaluation of each alternative (Levin, 1981). For example, to determine which approach would be the most cost effective method for intervening with speech impaired children, a crucial step in the analysis would be to specify the feasible alternatives to be evaluated--e.g., half-day versus full-day programs, or supplementing a center-based program with a home-based program versus just having the center-based program. It does not make sense to attempt to determine a given program is "cost effective". The real question concerns whether it is cost effective as compared to some feasible alternative.

Most previous educational research and evaluations had compared only the effectiveness of programs and ignored the availability, cost, and use of resources. However, because program selection and implementation (duration and intensity) are restricted as a direct function of resource allocation, program costs should be an element in any analysis of impact. The approach to cost effectiveness analysis proposed by the EIRI staff requires an examination of all expenses (costs) associated with a program. "Costs" are defined as the value of the resource that would be available for alternative use if a service was not provided (Conley, 1973; Levin, 1981). Although a review of previous research on early intervention programs did locate many studies analyzing "effect" data and some analyzing "cost" data, no true cost-effectiveness studies were identified. Most studies which have used the terms "cost benefit" or "cost effectiveness" have simply computed per child costs and/or have failed to do an extensive analysis of either costs or effects (Bedger, 1974; Frakes, 1981; Frohreich, 1973; Kakalik et al., 1981).

The controversy surrounding the "best" mode for early intervention has increased over the years. The increased use of different methods of service delivery stimulated much of this debate. Unfortunately, questions about the "costs" and "benefits" to parents and society of different forms of intervention have been largely unanswered. The development of cost-effectiveness analysis procedures to be used by the Early Intervention Research Institute builds upon cost-effectiveness analysis methods proposed by Levin (1975, 1981):

To carry out its basic mission, the Utah State University Early Intervention Research Institute established the following goals:

1. Integrate the findings and conclusions from previously conducted research on early intervention to determine what is known, what gaps exist, and where future research should focus. Update this review annually and integrate the findings from this update with the Institute's own ongoing work.
2. Conduct an integrated program of early intervention research (including longitudinal research) focused on the most important problems and issues encountered in delivering early intervention in typical service settings.
3. Disseminate information about the Institute's findings and products to a broad audience of professionals and families concerned with early intervention for the handicapped.
4. Train graduate students and research assistants in research techniques and effective methods of intervention applicable to preschool handicapped populations.
5. Formally evaluate the impact of the Institute's findings and products in the field of early intervention.
6. Solicit input, criticism and feedback from a broad constituency (Advisory Committee members and others) to ensure that the Institute's direction and procedures are appropriately focused

and being carried out in such a way as to result in the broadest possible impact of institute findings and accomplishments.

During the first year of the Institute, the goals listed above were addressed through a series of three related research thrusts and a variety of other activities.

The first project utilized the techniques of meta-analysis as a tool to integrate the hundreds of completed research reports which have investigated early intervention with handicapped children. This comprehensive integration of existing research was designed to help the Institute staff determine what conclusions can be drawn from existing research, what gaps exist, and how conclusions about effectiveness varied between various subgroups of children or families (e.g., severity of handicapping condition, type of handicap, level of SES).

The second research project developed state-of-the-art techniques for analyzing the cost effectiveness of programs and applied those procedures to a cost-effectiveness analysis of half-day versus full-day programs. One of the most important outcomes of this research thrust was the development of procedures and "ingredients" for doing cost-effectiveness analyses of early intervention programs for the handicapped. In subsequent years of EIRI, the basic procedures developed during Year #1 will be applied to other questions and issues identified from the meta-analysis or through interaction with the field. Thus, the two major research thrusts for Year #1 served a "start up" function as described in the RFP, while at the same time resulting in important information which can effect practice and influence policy.

The third research thrust for Year #1 took advantage of a unique data base to examine a question about the effectiveness of early intervention for which it appears that very few data exist--the long-term impact of early intervention with hearing impaired children. Four groups of hearing impaired children (each group with 25 children) born between 1973 and 1975 were compared on a variety of dependent variables. One of these groups received home-based early intervention through Project SKI*HI (a nationally dissemi-nated early intervention project for hearing impaired children based at Utah State University) before 30 months of age, a second group received home-based intervention from Project SKI*HI after 30 months of age, a third group received center-based intervention, and a fourth group did not receive any early intervention.

Other major activities undertaken by the Early Intervention Research Institute during its first year included: (1) disseminating information about research findings, (2) naming and utilizing an advisory council to provide feedback on Institute efforts, (3) training of graduate students, and (4) establishing a management system for project activities.

A detailed description of the results from the three major research thrusts and the other major activities undertaken by the Institute appears in the sections to follow.

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CHAPTER II

META-ANALYSIS OF EARLY INTERVENTION RESEARCH

Evaluation (i.e., efforts to determine the worth or value) of early intervention programs have taken many different forms--both large and small. For example, in 1975 a third party evaluation contract was awarded to Battelle Institute of Columbus, Ohio, to evaluate the impact of early intervention demonstration programs funded by the Handicapped Children's Early Education Program of the U.S. Department of Education. One hundred twenty-nine randomly selected children in 29 projects from all over the U.S. were tested in areas including social, motor, cognitive, and communicative skills. Based on these data, the evaluators concluded that across all categories of handicapping conditions, children made one-and-a-half to two times greater gains than they would have been expected to make without the benefit of the project. Additionally, 97% of those parents interviewed perceived positive changes or improvements which they attributed to the project (Stock, Wnek, Newborg, Schenck, Gabel, Spurgen, & Ray, 1976). DeWeerd (1981) concluded that another indicator of the worth of HCEEP-funded demonstration projects was the fact that in 1979, 85% of the initial demonstration projects had secured funds to continue their programs and that the level of funding had increased. Literally hundreds of other research studies for both HCEEP-funded and other early intervention programs have collected data to determine the "worth" of such programs.

Unfortunately, the results and conclusions from such evaluations have been disturbingly discrepant. For example, there is growing agreement among practitioners that early intervention promises significant resolution or amelioration to some of the most persistent and expensive problems which educators face. According to Jordan, Hayden, Karnes, and Wood (1977):

> Programs providing early educational and therapeutic programming to meet the needs of young handicapped children and their families are reducing the number of children who will need intensive or long-term help. The importance of reaching handicapped children early and working to help them reach their full potential cannot be overemphasized. With early help, the sooner the better, these children can often function at higher levels than has been dreamed possible in prior years. (p. 26)

However, the promise and benefits of early intervention have not been universally accepted. As Hodges and Sheenan (1978) pointed out, "no consistent picture of success emerged from the early childhood education efforts of the 1960s. Although modest or robust immediate gains from structured programs were frequent, just as frequently, these gains eroded after the children left the experimental programs" (p. 4). Gottfried (1973) concluded that:

> Gains in cognitive and intellectual functioning attributable to preschool training were found by some projects but not others at the time of school entrance. However, there were no reports of substantial persistent gains beyond the third grade. Those studies which conducted school-age follow-up studies uniformly reported disappointing long-term results. (p. 286)

Even though the results of research should guide policy and practice, research on early intervention, when considered as a total body of evidence, has been confusing. Some researchers have reported success; others, failure. Some have suggested that early intervention is effective but only for specific subgroups of children. Thus, even though the concept of early intervention has been heartily endorsed by individual practitioners and state and federal funding agencies (Swan, 1980), the research evidence is not at all clear. Even more important, the factors which account for the variation in research results have not been identified.

As primary research articles investigating the effectiveness of early intervention have accumulated, practitioners and policymakers have increasingly called for an effective integration of the knowledge which is being produced. In theory, the results of both basic and applied research on a given topic, such as early intervention, should culminate in increased knowledge and improved practice. In reality, however, the very important step of integrating the findings of the completed research on the effectiveness of early intervention into conclusions which affect practice and influence policy has not occurred.

Problems with Typical Efforts to Integrate Research Findings

In recent years, more and more researchers have realized that commonly used techniques for summarizing the results of completed research were inadequate (Glass, 1976; Jackson, 1980; Light & Smith, 1971). As Glass (1976) pointed out:

> We need more scholarly effort concentrated on the problem of finding the knowledge that lies untapped in completed research studies. We are too heavily invested in pedestrian reviewing where verbal synopses of studies are strung out in dizzying lists. The best minds are needed to integrate the staggering number of individual studies. This endeavor deserves higher priority now than adding a new experiment or survey to the pile. (p. 4)

The typical approach among social scientists to reviewing and integrating the literature on a given topic follows one of two routes. In both approaches, a group of easily accessible articles from fairly prominent journals or other publications are listed. In the first approach, the reviewer offers a verbal synopsis of the 20 to 40 research articles and often concludes that the existing research is inconclusive: sometimes researchers find one thing; sometimes, another. A call is then made for additional research using better techniques and more precise methodology so that the truth of the matter can be discovered. In the second approach, the reviewer begins with a similar group of articles, but eliminates all but a few because of supposed design or analysis flaws. The findings of the remaining "acceptable" studies (frequently studies which agree with the work of the reviewer or his/her colleagues) are presented as the truth of the matter.

Both approaches to integrating and understanding previously completed research in the social sciences have serious inadequacies. Almost always, the articles selected for the review are only a small, nonrepresentative fraction of the total research on the particular topic, and thus ignore a significant body of information. In addition, the "definitive" study almost never exists. Obviously, better design and analysis procedures are desirable, but it is not at all unusual for a series of well designed studies on the same topic in the social sciences to yield conflicting results.

Meta-Analysis Procedures

The problems which have been experienced with trying to integrate the existing literature on the effectiveness of early intervention are pervasive, but they are not intractable. Over the last decade, substantial effort has been devoted to improving techniques for integrating the results of previous research (Glass, McGaw, & Smith, 1981; Light & Pillemer, 1982; Hunter, Schmidt, & Jackson, 1981; Rosenthal, 1978). Out of these efforts has evolved a set of procedures known as meta-analysis which have much potential for effectively summarizing the results of previous research.

Briefly described, conducting a meta-analysis requires the location of either all studies or a representative sample of studies on a given topic, converting the results or outcomes of the studies to a common metric, coding the various characteristics of studies that might have affected the results, and then using correlational and descriptive statistical techniques (both univariate and multivariate) to summarize study outcomes in a way that allows the examination of covariation of study characteristics with outcomes. In his critique of previous efforts to integrate the findings of research in the social sciences, Jackson (1980) concluded that the "meta-analysis approach is a very important contribution to the social science methodology. It is not a panacea, but it will often prove to be quite valuable when applied and interpreted with care" (p. 455).

Since its introduction, the meta-analysis approach has been used to review and integrate research findings on a wide variety of topics including the relationship of class size to achievement (Glass & Smith, 1979), the relation of socioeconomic status and academic achievement (White, 1982), the efficacy of stimulant drugs for treating hyperactivity (Kavale, 1980; White & Myette, 1982), the effectiveness of training and reinforcement on standardized test results (Taylor & White, 1981), and the effectiveness of sensorimotor training with handicapped children (Kavale, 1982). In all, over 100 meta-analysis studies have been completed and reported. Although not all previous meta analyses have been well done, it is clear that the meta-analysis techniques are being accepted as a useful methodology by substantial numbers of professionals.

It should be noted that some educational researchers have raised questions about the use and interpretations of meta-analysis (Mansfield & Bussee, 1977; Eysenck, 1978; Gallo, 1978; Shaver, 1979; ERS, 1980; Simpson, 1980). Some have questioned the results of a specific meta-analysis; others have raised cautions or concerns about the methodology per se. Most of these criticisms and cautions have been responded to in the literature (Glass, 1978, 1980; Glass & Smith, 1978; Glass et al., 1981). The most important point that such concerns have demonstrated is that meta-analysis, like all other research procedures, is not a fail-safe approach. However, the meta-analysis methodology, if properly implemented, has excellent potential as a tool for integrating existing research.

Purpose and Objectives

The purpose of this study was to apply meta-analysis techniques to as many research studies on the efficacy of early intervention as could be identified. All primary research studies were included in the meta-analysis which: (a) reported research on the efficacy of an intervention program designed to improve the cognitive, social/emotional, or life skills of handicapped, at-risk, or disadvantaged children, (b) began before children were 66 months old, and (c) were designed and reported so that an estimate of program impact could be calculated. Such estimates of impact were included from experimental, quasi-experimental, and pre/post designs.

The specific objectives of the study included:

1. To determine what past research reveals about the effectiveness of early intervention, including what factors and study characteristics (e.g., age of child, type of intervention, nature of the dependent variables, involvement of the family) covary with and possibly influence study outcomes.
2. To prioritize and focus future research efforts by identifying those research questions which need further investigation and replication as opposed to those questions which have already been sufficiently investigated, documented, and replicated.

The remainder of this report will briefly examine the adequacy of previous reviews of the early intervention literature to establish a foundation for the work described herein, describe the procedures used in the meta-analysis, and report the results of the first 156 studies included in the analysis. Findings in this report should be viewed as tentative since additional studies are now being coded for future inclusion. Appendix 2-A includes a listing of the primary references of each of the studies thus far included, and a listing of studies which have been identified and obtained but will be included later.

Analysis of Previous Reviews of Early Intervention Research

As in any systematic process of scientific inquiry, it was important, before beginning the meta-analysis of early intervention research, to examine previous efforts to accomplish the same goals. Such a "review of the literature" (in this case, an analysis of previous efforts to integrate early intervention research) served two main purposes. First, an analysis of previous reviews was necessary to determine whether there was a need for another review of the literature (e.g., was previous work methodologically sound; did sufficient evidence, i.e., primary research studies, exist to answer the questions of interest; was there substantial evidence which had not been included in previous reviews?). Secondly, an examination of previous work is important to plan for future work by establishing an appropriate point of departure and identifying the strengths and weaknesses of past investigations so that the former can be built upon and the latter avoided.

Previous Reviews Included in Analysis

A computer-assisted search of ERIC, Psychological Abstracts, CEC Abstracts, Dissertation Abstracts, Social Science Research, SSIE Current

Research, and Index Medicus was conducted to identify previous reviews of the literature which dealt with (a) preschool or young children, (b) some form of intervention or treatment, and (c) handicapped, disadvantaged, or at-risk populations. Sixty-four review articles were identified by this search (see Appendix 2-B for a list of references of those articles). A coding sheet was used to collect information about each review on the following questions:

1. Does the reviewer critique previous reviews and explain how his/her review will differ from, expand, or replicate previous work?
2. Does the reviewer describe the procedures used to locate or delimit primary research studies used in the review?
3. What is the actual number of efficacy of early intervention studies used in the review to draw conclusions?
4. How did the author represent the results or findings of individual efficacy studies?
5. How did the reviewer consider data about how concomitant variables might covary with outcomes?
6. What variables were suggested by the reviewer as variables which might affect the effectiveness of early intervention (e.g., low vs. high SES subjects; or age at which intervention begins)?
7. What were the conclusions of the authors about common methodological weaknesses in the primary research included in the review?
8. What were the major conclusions of the review?

The 64 review articles included in the analysis were published between 1966 and 1982 in a variety of educational, psychological, and medical journals, as well as government reports, ERIC documents, and textbooks. The 64 reviews cited a total of 630 primary research studies[1] to draw conclusions about the efficacy of early intervention. Surprisingly, there was very little overlap in the primary research studies cited from review to review as shown in Table 2.1. For example, 466 studies were cited in only one review and only one study was cited in as many as 24 of the 64 reviews.

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[1] Although 630 efficacy of early intervention "studies" were counted, these studies were reported in 1,027 unique articles. Often, there were multiple articles written about the same study. Primary research articles written by the same authors were considered to be from the same study unless there was contrary evidence.

Table 2.1

Frequency with Which Primary Research Studies on Efficacy of Early Intervention Were Cited by 64 Reviewers

Number of Reviewers Who Cited	Number of Studies
1	466
2	84
3	22
4	26
5	14
6-7	6
8-13	8
14-18	3
24	1
Total number of primary studies cited by reviews	630

The particular research studies which were cited most frequently in these 64 reviews are shown in Table 2.2. The primary focus of most reviews was on disadvantaged populations; and 18 of the reviews did not consider handicap populations. The number of early intervention efficacy studies cited in each of the reviews ranged from 9 to 74, with a median of 16.5.

Is There A Need for Another Review of the Early Intervention Research Literature?

One of the most obvious evidences of need for another review of the early intervention research literature was the fact that although hundreds of early intervention efficacy studies were identified in this analysis, the average number of studies cited in existing reviews was only 16.5. Although

Table 2.2

Primary Research Studies Most Frequently Cited by Reviewers of Early Intervention Research Literature

Research study and/or principal author(s)	No. of reviewers citing study	Representative references
1) Weikart/Perry Preschool Project	24	Weikart (1967, 1968) Weikart et al. (1978)
2) Karnes	18	Karnes et al. (1969) Karnes et al. (1970)
3) Gray & Klaus/Early Training Project	17	Gray & Klaus (1965) Gray & Klaus (1970)
4) Skeels & Skodak	17	Skeels (1965) Skodak & Skeels (1949)
5) Heber & Garber/Milwaukee Project	13	Heber & Garber (1975)
6) Bereiter & Engelman/Direct Instruction	13	Bereiter & Engelman (1966)
7) Kirk	10	Kirk (1973)
8) Gordon/Florida Parent Project	9	Gordon (1968)
9) Caldwell	9	Caldwell (1967) Caldwell (1974)
10) Ramey/Abecedarian Project	8	Ramey (1974) Ramey & Campbell (1979)
11) Levenstein/Verbal Interaction Project	8	Levenstein (1976)
12) Hodges	8	Hodges & Spicker (1967)

some of the later efficacy studies would not have been available for earlier reviews, the correlation between year of publication for each of the reviews and number of efficacy studies cited was -.10. Thus, the failure to cite more efficacy studies does not appear to be a function of the number of articles available. The small number of efficacy studies cited, along with the failure to specify the criteria for inclusion/exclusion in most previous reviews, raises serious questions not only about the generalizability of conclusions but about the objectivity of the reviews. With hundreds of articles available on the efficacy of early intervention, one could probably find a dozen articles to support any point of view. The fact that so few studies are cited in most reviews is disturbing.

Another major problem with previous reviews is the way in which results of primary research studies are reported. Seventy-eight percent of the 1,500 citations of efficacy studies in the 64 reviews reported only that "differences" were found between experimental and control groups, or that the study demonstrated that the intervention was "effective" or "ineffective". The problems with such reporting are evidenced by the following typical statement taken from Stone (1975, p. 17): "A number of intervention techniques have been reported to be of value to the developmentally delayed child. Among these are perceptual training (Frostig & Horne, 1964) . . . increasing the child's exposure to a variety of stimuli (Koegel, 1970), and increasing the discriminative aspects of individual stimulus (Horowitz, 1968)." When the outcomes of previous studies are reported in this manner, it is impossible for the reader to know whether differences between groups are educationally significant, statistically significant, or trivial. Consequently, it is difficult to know how much confidence to place in the conclusions of the reviewer.

Another important weakness in existing reviews of early intervention is the lack of attention to how subject or study characteristics may covary with results. For example, do studies which report interventions with very young children as subjects generally find larger benefits than studies which report interventions with older preschool children; or do studies with mildly handicapped children result in larger differences than studies with moderately or severely handicapped children? Seventy-five percent of the reviews either failed to consider the covariation of concomitant variables with outcomes or based conclusions about such covariation on less than 20% of the efficacy studies cited.

A less serious but nonetheless important weakness with existing reviews was their failure to consider previous reviews of the literature. Of the 64 reviews coded in our analysis, only two cited more than two previous reviews, critically described the procedures and conclusions of those reviews, and described how their review would differ from or improve on previous work. Forty-nine of the 64 reviews failed to cite any previous reviews of the literature. The failure to acknowledge and build upon the work of others is an important weakness that potentially impairs the quality of future work.

In summary, there are a number of important methodological weaknesses in previous reviews of the early intervention research literature. The number of efficacy studies cited in any given review is relatively small and probably not representative of the research which has been conducted. Techniques for examining the magnitude of outcomes and the covariation of subject and study characteristics have been inadequate. Little attention has been paid to earlier work which would permit a systematic building on the findings of others. Given these weaknesses, the amount of primary research which has been conducted to determine the efficacy of early intervention and the millions of dollars which are spent yearly to provide early intervention to handicapped, disadvantaged, and at-risk children underscores the need for high quality integrative reviews of the literature. If properly done, such a review would provide important information to policymakers, program administrators, researchers, and practitioners about whether and how to implement early intervention programs.

Planning for Future Work

Table 2.3 lists the overall conclusions reached by reviewers in the 64 reviews considered. As shown in panel (a), most reviewers concluded that early intervention is generally effective if properly implemented. Specific benefits attributed to early intervention (see panel b) included cognitive, academic, social, and attitudinal growth for the target child and improved functioning of the parents and the siblings.

Even though most reviewers concluded that there was sufficient evidence to document the immediate benefit of early intervention, there was much less support for long-term benefits. Of those 23 reviews in which the longitudinal effects of early intervention were considered, only 5 (22%) concluded that the gains attributable to early intervention programs were maintained; 15 (65%) concluded that gains were not maintained; and 3 (13%) concluded that there was not sufficient evidence to draw conclusions.

Table 2.4 lists the most frequently cited variables which might be associated with or influence the success of early intervention. Table 2.5 shows the conclusions most frequently drawn by reviewers as they relate to variables cited in Table 2.4. Not every variable listed in Table 2.4 is represented in Table 2.5 because many reviewers cited a concomitant variable as important, but did not draw specific conclusions about that variable. The most frequently drawn conclusions in the 64 reviews considered were related

Table 2.3

Conclusions About the Overall Effectiveness of Early Intervention

(a) GENERAL CONCLUSIONS

# and % of reviews drawing conclusion			
47	73.4%	o	Early intervention is generally effective if properly implemented.
9	14.1%	o	Early intervention is effective, but only in special situations.
7	10.9%	o	Evidence about early intervention effectiveness is inconclusive.
1	1.6%	o	Early intervention is generally not effective.

(b) SPECIFIC BENEFITS OF EARLY INTERVENTION

# of reviews drawing conclusions		
11	o	Increases IQ
9	o	Improves academic achievement
7	o	Enhances social skill
7	o	Improves self-concept and emotional health
6	o	Improves parents' behavior and attitudes
5	o	Improves functioning of siblings
5	o	Results in fewer children placed in special education programs
3	o	Results in fewer children retained at grade level
3	o	Improves language development

(c) LONGITUDINAL EFFECTS OF EARLY INTERVENTION

5	o	Gains made in early intervention programs are maintained.
15	o	Gains made in early intervention are not maintained.
3	o	Evidence about long-term maintenance is contradictory and more research is needed.

Table 2.4

Variables Suggested by Previous Reviewers as Potential Mediating Variables and the Number of Different Reviews in Which Each Was Cited[a]

INTERVENTION VARIABLES

# of reviews citing variable	Variable
23	Degree of parental involvement
14	Degree of stucture in intervention
14	Training/competence/attitude of intervenor
12	Nature of intervention (e.g., philosophical orientation or type of curriculum)
11	Length of intervention
10	Use of operant conditioning principles
9	Parents' attitude and motivation
9	Degree to which instructional level is appropriate for target child
8	Amount of intervenor/child interaction
8	Parent modeling of correct behavior aside from explicit intervention involvement
7	Degree of individualization
6	Intervenor/child ratio
6	Continuity between preschool and school programs
6	Site of intervention (center vs. home)
5	Clarity of program goals

SUBJECT VARIABLES

# of reviews citing variable	Variable
21	Age at which intervention begins
20	Socioeconomic status (SES)
17	Degree of environmental stimulation/ deprivation in home setting
14	Parent/child relationship, and whether family is intact
8	Nutritional level, health care, or immunization
8	Severity of handicap
8	Race
7	Sex
6	IQ level of child prior to intervention
5	Type of handicap
5	Previous preschool experience

[a] Only variables which were suggested by five or more reviewers are included in this table.

Table 2.5

Conclusions About How Mediating Variables Are Related to, or Influence, Intervention Effectiveness

(Numbers in parentheses indicate the number of reviewers taking that position)

Mediating variable	Pro	Con
Degree of parental involvement	Interventions that involve parents are most economical and most effective (12)	
Age at intervention	The earlier the age at which intervention begins, the greater the gains (14)	Similar gains result from successful programs regardless of age of entry (6)
Critical age	Efforts to intervene after the critical period becomes progressively less effective (8)	There is no indication of a critical period in which early intervention is most effective (3)
Degree of structure in the intervention	More structured intervention programs result in greater gains (12)	Degree of structure in the intervention is not related to intervention effectiveness (1)
Nature of intervention	Curriculum type per se is unrelated to intervention effectiveness. However, more comprehensive curricula (including cognitive, behavioral, and social-emotional components) are more effective (6)	
Training/competence/attitude of intervenor	Better trained, more competent interventionists result in more effective programs (4)	
Length of intervention	Longer programs result in greater gains (4)	Length of intervention is unrelated to child gains (4)
Center vs. home-based	Home and center-based programs, if well implemented, are equally effective (4)	
Individualization	Individualized intervention is more effective	
Socioeconomic status (SES)	Low SES children make greater gains in gross motor skills, and high SES children make greater gains in IQ (6)	
Race	Race is unrelated to intervention effectiveness (1)	Black children gain significantly more from early intervention than white children (2)
Severity of handicap	Severity of handicap substantially influences program success (2)	Severity of handicap is unrelated to program success (1)
Sex	Boys make greater gains than girls on some outcomes (1)	Gains are unrelated to sex of the child (1)

to the involvement of parents, the age at which intervention begins, and the degree of structure in the intervention program. As can be seen in Table 2.5, there was a fair degree of disagreement among reviewers about the influence of many of the variables cited.

This information does much in planning for another review of the early intervention research literature. First, these data emphasize that any additional efforts to integrate the research on early intervention needs to focus on both immediate and long-term benefits, needs to examine outcomes in a variety of areas (IQ, academic achievement, social skills, self-concept, functioning of parents and other family members, etc.), and needs to examine the covariation with study outcomes of a variety of subject (e.g., age at which intervention begins, socioeconomic status, race, sex, etc.) and intervention (e.g., degree of parental involvement, degree of structure in intervention, training of intervenor, etc.) variables. The results of this analysis identify those variables which have been suggested most frequently as well as variables which have been cited infrequently but may still be important.

Summary

The analysis of previous reviews of the early intervention research literature definitely established the need for another integrative review. Given the large number of existing early intervention efficacy studies, the meta-analysis techniques described below seem like a potentially valuable set of procedures for making sense of this large data base. The methodological weaknesses identified in previous reviews underscores the need for conducting another review. The conclusions of previous reviews, both in terms of immediate and long-term benefits of early intervention, and the subject and study characteristics which are reported to covary with intervention effectiveness, identifies the key information which needs to be collected and interpreted in conducting such a review.

PROCEDURES

Included in this section is a description of (a) the procedures used in selecting and identifying early intervention efficacy studies to be included in the meta-analysis, (b) the procedures used in developing the coding system and conventions, and (c) the procedures for coding the articles included.

Identifying Studies to Be Used in the Meta-Analysis

Efforts were made to include any study of the efficacy of early intervention with handicapped, at-risk, or disadvantaged children which began before 66 months of age and provided information which could be used in estimating the benefit of the intervention program. Estimates of benefit were derived from pre/post, true experimental, and quasi-experimental designs. Single subject research designs have not been included at this point because the type of data yielded by such designs is difficult to incorporate with more traditional group designs in a meta-analysis data set. However, various alternatives are currently being explored that will enable us to utilize this valuable data set as the results of the meta-analysis are expanded during 1983-84.

The first step in identifying articles was a computer-assisted literature search conducted at the Utah State University Library through the DIALOG system. This computerized computer-assisted search was done of the ERIC, Psychological Abstracts, CEC Abstracts, Dissertation Abstracts, Social Science Research, SSIE Current Research, and Index Medicus data bases. Very broad guidelines were set deliberately for this search in an effort to include as many studies as possible so that appropriate studies would not be missed. An example of the actual terms used in the computer-assisted search for the ERIC data base is shown in Table 2.6. Similar sets of descriptors were used for each of the other data bases. This search resulted in the identification of 1,402 articles which were then sorted by staff members into the approximately 800 articles which reported efficacy studies and those which reported other information about early intervention. Each article was then screened to determine if it reported information on an early intervention program which began before 66 months of age for subjects which were handicapped, at-risk, or disadvantaged and provided some data from which an estimate of the magnitude of program effect could be estimated. Articles which passed this initial screening were then put in the "To Be Coded" file. Articles which were rejected at this stage were independently checked by another staff member to make sure that relevant articles were not excluded.

It is interesting to note that the computer-assisted search was not a very effective means of identifying articles to be included in the meta-analysis. Of the almost 1800 articles obtained thus far in the meta-analysis effort, only 305 (less than 20%) came from the computer-assisted search. Most of the articles that have been identified were obtained through references of other articles already in the files.

In addition to the computer-assisted search and the bibliographic searches of articles already obtained, letters were sent to each of the HCEEP demonstration and outreach project directors and to all members of the EIRI Advisory Committee and field reviewers (copies of letters and the list of field reviewers and Advisory Committee members are included in Appendix 2-C) asking them to identify additional studies of early intervention efficacy that may not have been identified in our search.

Table 2.6

Descriptors Used for Computer Assisted Search of ERIC for Meta-analysis Articles

DESCRIPTORS	Citations	4,606	11,055	812	16,245	76	5,708	23	7,573	25	6,809	7	2,315	8	16	2,719	7	1,615	28	2,508	9	21	166	124	111
1. Early Experience	581	X		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
2. Young Children	1,594	X		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
3. Infant	2,437	X		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
4. Early Childhood Education	6,457		X	ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
5. Preschool Education	5,111		X	ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
6. Educational Therapy	146		X	ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
7. Early (H) Intervention	137		X	ⓧ		ⓧ		ⓧ		ⓧ		ⓧ		ⓧ	ⓧ		ⓧ		ⓧ		ⓧ	ⓧ	ⓧ	ⓧ	ⓧ
8. Handicapped Children	5,973				X	ⓧ																	ⓧ		
9. Exceptional Persons	602				X	ⓧ																	ⓧ		
10. Exceptional Child Research	8,021				X	ⓧ																	ⓧ		
11. Handicap Identification	296				X	ⓧ																	ⓧ		
12. Learning Disabilities	4,561						X	ⓧ															ⓧ		
13. Learning Problems	1,080						X	ⓧ															ⓧ		
14. Academically Handicapped	171						X	ⓧ															ⓧ		
15. Minimal Brain Dysfunction	332						X	ⓧ															ⓧ		
16. Mental Retardation	6,982								X	ⓧ													ⓧ		
17. Mental Disorders	642								X	ⓧ													ⓧ		
18. Emotional Disturbances	2,795										ⓧ	ⓧ											ⓧ		
19. Behavior Problems	2,501										ⓧ	ⓧ											ⓧ		
20. Discipline Problems	583										ⓧ	ⓧ											ⓧ		
21. Personality Problems	226										ⓧ	ⓧ											ⓧ		
22. Autism	595										ⓧ	ⓧ											ⓧ		
23. Hyperactivity	686										ⓧ	ⓧ											ⓧ		
24. Self-Mutilation	71										ⓧ	ⓧ											ⓧ		
25. Emotional Problems	523										ⓧ	ⓧ											ⓧ		
26. Language Handicaps	1,183												X	ⓧ									ⓧ		
27. Speech Handicaps	1,020												X	ⓧ									ⓧ		
28. Speech Pathology	164												X	ⓧ									ⓧ		
29. Aphasia	249												X	ⓧ									ⓧ		
30. Communication Disorders	11												X	ⓧ									ⓧ		
31. Deafness	1,897														ⓧ								ⓧ		
32. Hearing Impairments	2,764														ⓧ								ⓧ		
33. Visual Impairments	1,967															X	ⓧ						ⓧ		
34. Blindness	1,199															X	ⓧ						ⓧ		
35. Perceptual Handicaps	295															X	ⓧ						ⓧ		
36. Developmental Disabilities	451																	X	ⓧ				ⓧ		
37. Down's Syndrome	306																	X	ⓧ				ⓧ		
38. Neurological Impairment	682																	X	ⓧ				ⓧ		
39. Congenital Impairments	197																	X	ⓧ				ⓧ		
40. Physical Disabilities	2,013																			X	ⓧ		ⓧ		
41. Cerebral Palsy	250																			X	ⓧ		ⓧ		
42. Epilepsy	164																			X	ⓧ		ⓧ		
43. Diabetes	116																			X	ⓧ		ⓧ		
44. Muscular Dystrophy	171																			X	ⓧ		ⓧ		
45. Multiple/Mild Disabilities	2,301																					ⓧ	ⓧ		
46. Total Unique Abstracts																							ⓧ		
47. High Risk or Disadvantaged	13,487																							ⓧ	ⓧ
48. Unique from #46																									ⓧ

X = or   ⓧ = and

Once articles were obtained for the meta-analysis, a very specific set of procedures was followed in preparing them for coding, following them through the coding process, and preparing data from the coding for analysis. This process is depicted in Figure 2.1 and is described in written form in Appendix 2-D.

Development of Coding System and Conventions

A coding system was developed to collect information about each article included in the meta-analysis. Information collected about each study included:

- a description of the subjects included in the research,
- the type of intervention used,
- the type and quality of research design employed,
- the type of outcomes measured and procedures used, and
- the conclusions reached by the study.

The specific items included on this coding sheet were identified using the analysis of previous reviews so that variables which other authors suggested as important were included. In addition, coding systems used in previous meta-analyses were examined and useful features incorporated. This first draft of the coding sheet was then "pilot tested" by members of the meta-analysis team on eight different articles. Several revisions of the coding system were done during this process. A copy of the coding system which was used to code the studies included in the meta-analysis is shown in Appendix 2-E.

For each item on the coding sheet, conventions were written which provided operational definitions for coding. A copy of the meta-analysis conventions is included in Appendix 2-F. Because it was impossible to specify every eventuality that would be encountered in coding studies, coders

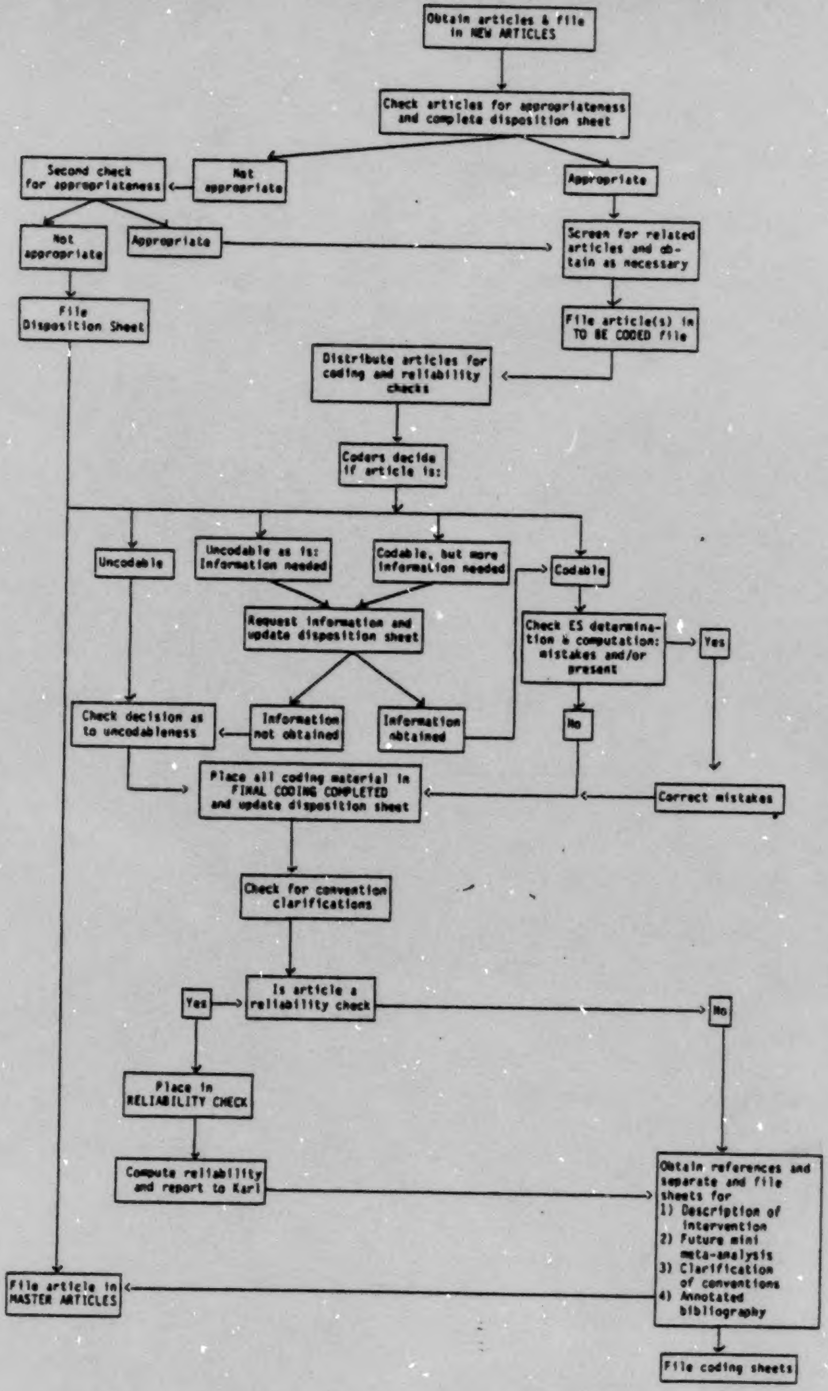
Obtain articles & file in NEW ARTICLES
Check articles for appropriateness and complete disposition sheet
Not appropriate
Appropriate
Second check for appropriateness
Not appropriate
Appropriate
Screen for related articles and obtain as necessary
File Disposition Sheet
File article(s) in TO BE CODED file
Distribute articles for coding and reliability checks
Coders decide if article is:
Uncodable
Uncodable as is: Information needed
Codable, but more information needed
Codable
Request information and update disposition sheet
Check ES determination & computation: mistakes and/or present
Yes
No
Check decision as to uncodableness
Information not obtained
Information obtained
Place all coding material in FINAL CODING COMPLETED and update disposition sheet
Correct mistakes
Check for convention clarifications
Yes
Is article a reliability check
No
Place in RELIABILITY CHECK
Compute reliability and report to Karl
Obtain references and separate and file sheets for
1) Description of intervention
2) Future mini meta-analysis
3) Clarification of conventions
4) Annotated bibliography
File article in MASTER ARTICLES
File coding sheets

Figure 2.1 Flowchart of procedures for coding meta-analysis articles.

were also instructed to provide "coding clarifications" for items they coded for which the conventions were not a good "fit". These coding convention clarifications were discussed with the entire staff each week in staff meeting and corrections and revisions to codings were made based on that information.

One of the most important pieces of information collected about each study was the estimate of program effect. Two types of "Effect Size" were collected wherever possible: a standardized mean difference Effect Size and a variance Effect Size. A standardized mean difference Effect Size was obtained for every study. The standardized mean difference was defined as the $(\overline{X}_E - \overline{X}_C) \div SD_C$ (see Glass, 1976). This standardized mean difference Effect Size measure converts all scores to a standardized score which has similar meaning across different types of variables. For example, an Effect Size of 1.0 on a measure of IQ indicates that the average person in the experimental group is 1 standard deviation or 15 points above the average person in the control group. An Effect Size of 1.0 on a reading test has approximately the same meaning, although it may be 25 points or 5 points depending on the metric of the test being used. For every measure, an Effect Size of 1.0 represents 1 standard deviation difference between the average score of each group and indicates that the average person in the experimental group would score at the 84th percentile of the control group (assuming normal distribution).

Using a standardized metric for outcome avoids problems of interpretation due to statistical artifacts which are dependent on sample size and allows the covariation of outcome and study/subject characteristics to be examined more completely. Unfortunately, means and standard deviations were not reported in all studies. In these cases, formula for converting F statistics, t statistics, analysis of variance tables, regression equations, and proportions to Effect Sizes were used (see Glass, McGaw, & Smith, 1981; also formula worksheet included in Appendix 2-F).

Procedures for Coding Studies

As noted earlier, written procedures for coding each study are included in Appendix 2-D. As described in those materials, several procedures were used to increase the accuracy and consistency of coding and are worth emphasizing here. First, after each article was coded, the coder would take the article and the coding sheets to another member of the team and provide a very brief synopsis of the type of design used in the study, which outcomes were coded, and which information in the article was used to compute the effect sizes. The "checker" would then check the logic of which outcomes had been selected and independently calculate effect sizes for those outcomes. This independent calculation would then be checked against the written computations which were done by the original coder. In addition, the checker would examine key variables on the coding sheet, check that every blank on the coding sheet was filled in, and make sure that the "checklist" on the first page of the coding sheet had been properly completed. At that point, if mistakes had been found, the issue would be resolved with the original coder, and then the coding packet would be turned in.

In addition to this checking of every article, interrater consistency checks were done for 10 articles included in the meta-analysis. The results of these interrater consistency checks are shown in Table 2.7. As can be seen, the average "exact" agreement (i.e., the most conservative estimate) on coding was 86.3 across the 10 studies. Not counting it as a disagreement when one coder chose to leave an item blank and another coder chose to make an educated estimate of an item, this figure increased slightly to 89%. The

Table 2.7

Summary fo Interrater Consistency Checks

References	Date	Exact	One Step	One Step & Blanks	% ES in Common	Karl	Glendon	Cie	David	Dennis	Gary	Margo	Duane
Brassell, W. R., Dunst, C. J. Fostering the object construct: Large scale intervention with handicapped infants. American Journal of Mental Deficiency, 1978, 32, 507-510.	2/11/83	80.4	82.0	84.1	100	X	X			X	X		
Gavrin, J., & Sacks, L. S. Growth potential of preschool aged children in institutional care: A positive approach to a negative condition. American Journal of Orthopsychiatry, 1963, 33, 399-408.	2/19/83	92.3	92.9	94.8	24	X	X	X	X				
Blank, M., & Solomon, F. A tutorial language program to develop abstract thinking in socially disadvantaged preschool children. Child Development, 1968, 39(2), 379-389.	3/8/83	88.46	90.17	92.10	100	X			X	X	X		
Karlsen, P. M. Comparison of the occupational therapy approach for healing the young cerebral palsied child. American Journal of Occupational Therapy, 1975, 29, 267.	3/30/83	85.03	86.62	87.90	100	X		X	X		X		
Harris, S. R. Effects of neurodevelopmental therapy on motor performance of infants with Down's syndrome. Dev. Medchild Neurol., 1981, 23, 477.	4/1/83	84.21	85.48	87.16	86	X	X			X			
O'Connell, J. C., & Farran, D. C. The effects of day care intervention on the use of intentional communicative behaviors in socioeconomically depressed infants. Paper presented at the Biennial Southeastern Conference of Human Development, Alexandria, Virginia. 1980 (ERIC Document Reproduction Service No. Ed 195 359) 13 pg.	4/14/83	90.10	91.17	93.46	100	X	X		X				
Banta, T. W., Higginbotham, L., & Levin, M. Evaluation of East Tennessee's child health and development project. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA, 1979. (ERIC Document Reproduction Service No. ED 175 174) 29 pg.	4/15/83	85.03	86.78	87.74	100	X	X	X		X			
Scott, R. Research and early childhood: The Home Start Project. Child Welfare, 1974, 53(2), 112-119.	4/20/83	90.73	92.43	90.73	67	X		X			X		
Starr-Salapatek, S., & Williams, M. L. A stimulation program for low birth weight infants. American Journal of Public Health, 1972, 62, 662-667.	6/28/83	79.2	80.0	82.5	75	X	X	X		X	X		
Fuschillo, J. C. Enriching the preschool experience in children from age 3: The evaluation. Children, 1968, 15, 140-143.	9/17/83	87.90	88.54	90.96	56	X	X				X	X	X
		86.5	87.7	89.2	93.0	10	7	5	4	5	6	1	1
		Median Value				Total #							

median value for the number of effect sizes chosen in common by various coders was 93%. The relatively high interrater consistency and the fact that checks of the computation and coding procedures were made for every article suggest a high level of consistency across the articles included in the meta-analysis.

Finally, it was noted earlier that because means and standard deviations were not always reported in the article, alternative computational formula needed to be used. Since the logic of the standardized mean difference effect size is based on the use of standard deviation of the control group, it was felt to be important to check the degree to which the use of alternative effect size computational formula might bias results. This was done by computing alternative effect sizes whenever an article provided enough information to compute an effect size using the means and standard deviation of the control group and to compute an effect size in other ways. The effect size used in the meta-analysis reported in the results section was always based on the means and standard deviation of the control group when that information was available. However, as shown in Appendix 2-G, in those cases where alternative forms of information were available, the average effect size was extremely close (usually within less than .05 of a unit).

DATA ANALYSIS PROCEDURES AND RESULTS

At this point, the data set for the meta-analysis consists of 1486 standardized mean difference effect sizes (ES) from 156 studies (which have been reported in 261 different articles/reports). Seven hundred and nine of these effect sizes come from studies which compared one type of intervention with another type of intervention (referred to below as intervention A vs. intervention B studies). For example, an early intervention research study might have compared using parents extensively to supplement a center-based program with a center-based program without parent involvement. Seven hundred and seventy-seven additional effect sizes were from studies which compared an early intervention treatment to a no-treatment condition. Of these 777 effect sizes, 139 came from studies in which the subjects were diagnosed as handicapped, and 638 came from studies in which the subjects were diagnosed as disadvantaged or at-risk. As noted in the Procedures section, it was possible for a single study to contribute more than one effect size if various subpopulations were compared (e.g., the effects of the program on mentally retarded children were examined separately from the effects on speech impaired children), outcomes were measured at different points in time (e.g., immediate posttest vs. 6-month follow-up), or outcomes were assessed in different construct areas (e.g., language, IQ, motor, self-concept). As shown in Figure 2.2, the median number of effect sizes per study was 4.0. The largest number of studies yielded only one effect size, but there were several studies which yielded 30 or more effect sizes per study.

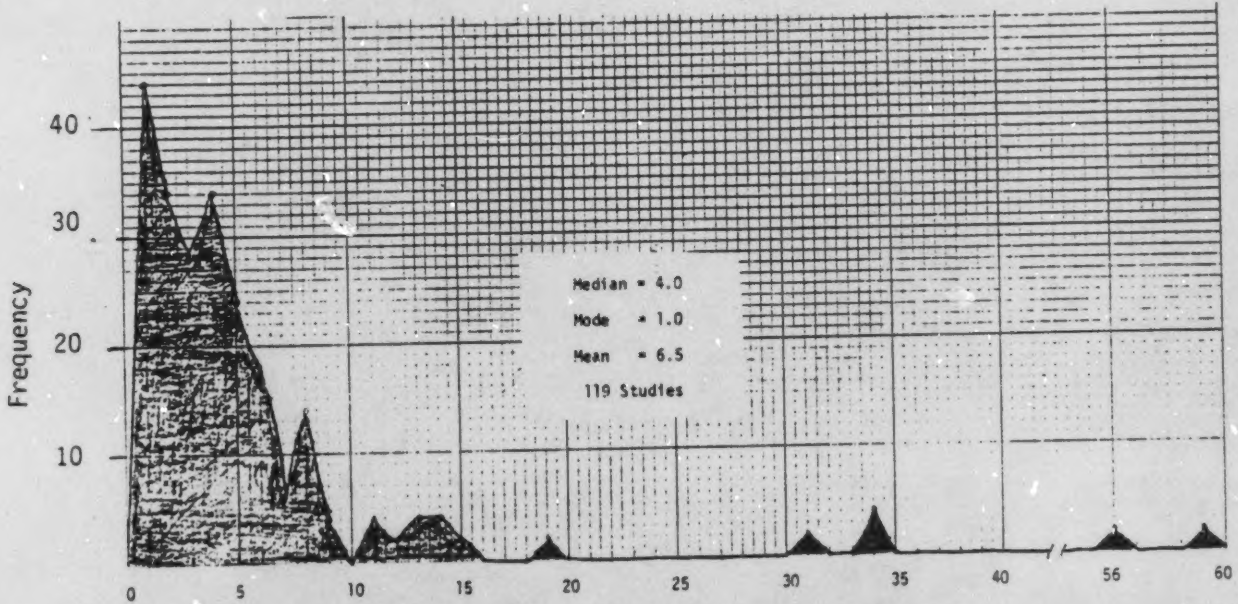

Figure 2.2. Number of Effect Sizes Per Study

Studies included in the meta-analysis were conducted between 1937 and 1983 with over half of the studies having been reported since 1970. Most studies were reported in "educational/psychological" journals (54.5%), with additional studies coming from "medical" journals (12.2%), books (7.7%), unpublished ERIC documents (9.9%), dissertations (.6%), and government reports (17.9%). The most commonly measured outcomes were IQ (which accounted for 42.5% of the effect sizes), academic or preacademic skills (14.8%), language (12.9%), and motor skills (8.2%). 54.8% of the outcomes came from studies which randomly assigned groups; 12.2% from well-matched control groups; and the remainder from poorly matched or pre/post designs. Thirty-eight percent of the outcomes were measured by blind data collectors. Most outcomes were measured less than one month after the intervention was completed (60.9%), and only 11.2% were measured more than 36 months after the completion of the intervention.

All of the analyses reported in this section are grouped by those studies which utilized disadvantaged or at-risk populations (hereafter referred to as disadvantaged) and those studies which utilized handicapped populations; therefore, it is important to understand more about the types of children and interventions included in these subcategories. In general, the quality of research conducted for disadvantaged populations is somewhat higher than the quality of research conducted with handicapped populations. As shown in Table 2.8, 62% of the outcomes for handicapped populations came from poorly designed studies, while only 30% of the outcomes for disadvantaged studies came from poorly designed studies. Only 18% of the outcomes for handicapped studies came from well-designed studies as opposed to 30% for the disadvantaged studies.

Table 2.8

		Handicapped (n = 139)	Disadvantaged (n = 638)
Quality of Study	Good	18%	30%
	Fair	20%	40%
	Poor	62%	30%

Ninety-seven percent of the outcomes in the disadvantaged group are from populations classified as disadvantaged while 3% are from at-risk populations (defined in this meta-analysis as genetically or medically at-risk). Most of the children included in the handicapped study populations were categorized as mentally retarded (39% of the outcomes) or combination of handicaps (20%). Orthopedically impaired children was the next most frequently represented group (15%), followed by general developmental delayed, emotionally disturbed, speech and language impaired, other health impaired, and multiply handicapped, all of which accounted for less than 5% of the total number of effect sizes from handicapped groups. Consequently, references in the remainder of this Results section to handicapped populations are generally talking about children classified as mentally retarded (it is important to note that in most studies which had a combination of handicapping conditions, mental retardation was the most predominant category).

Interventions classified as "educational" were the most frequent type of interventions for both handicapped and disadvantaged populations. However, for the disadvantaged populations, such interventions accounted for more than

90% of the outcomes included in this analysis. For the handicapped populations, educational interventions accounted for 51% of the outcomes, medical interventions for 17%, diet for 8%, and stimulation for 8% with the remainder being a mixture of interventions which were not classified.

In the remainder of the Results section, we will demonstrate a process used in the analysis thus far. Much work remains to be done and literally hundreds of additional comparisons will need to be made. The work accomplished thus far represents the first step in the analysis process and shows what can be concluded from the most basic analyses. However, in summarizing the data from hundreds of studies such as is the case here, it is important to try to disentangle the contributions of dozens of factors which are not independent from each other. Therefore, much additional cross-checking and testing of alternative explanations will need to be done during the second year of the Institute. Furthermore, there are still additional studies to be included in the meta-analysis data set. However, it is important to note that at this point, the meta-analysis has already included four times as many studies as any of the previous reviews which were examined during the first part of the project. Therefore, although the results should be viewed as tentative, they provide more evidence about the efficacy of early intervention and which types of intervention are most effective with which types of children than any of the previously reported reviews.

"Cleaning" the Data Set

After all coding was completed and data had been keypunched and verified, systematic checks of the data were made to identify any remaining coding and/or keypunching errors. The next step was to compute "FREQUENCIES" for each of the variables included in the data set. In other words, the frequency with which each option for each variable was coded was depicted to make sure that all scores fell within the possible limits for that variable. Mistakes were identified and corrected and then a random check of the data set was made by referring back to the original coding sheets. A small number of additional errors were identified and corrected. In total, corrections accounted for less than .08 of 1%. Given these procedures and the procedures described in the previous section for checking the accuracy and consistency of coding, we are confident that the data set is clean and that it accurately represents the information presented in the studies thus far included.

Average Standardized Mean Difference Effect Size For Each Level of Each Variable

Variables coded about each study were of two different types: (a) continuous data (such as, year in which the document was published ranged from 1937 to 1983), or (b) categorical variables (such as, degree to which intervention was tailored to child; 1 = no particular tailoring, 2 = somewhat tailored, 3 = substantially tailored). Based on the frequencies described above, each continuous variable was subcategorized into a discrete number of categories. For example, year in which the document was published was subcategorized into 1 = before 1965, 2 = 1966 through 1969, 3 = 1970 through 1972, 4 = 1973 through 1975, 5 = 1976 through 1980, and 6 = 1981 and after. Using these categories, the average effect size for each level of each variable was computed separately for handicapped and disadvantaged populations. The results of this analysis are included in Appendix 2-H. To explain how the data in Appendix 2-H are organized, a section of the appendix is reproduced below in Table 2.9. As shown in Table 2.9, the data in Appendix 2-H show the number of data points on which each calculation is based and the average standardized mean difference effect size and the standard deviation of the data on which that average is based. For example,

Table 2.9

Excerpt from Summary of Standardized Mean Difference Effect sizes for All Levels of Each Variable

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	of data points (N)	ES	SD
I-1 STUDYID	(ID # for each study)	139	.53	.70	638	.42	.59
I-3 YEAR	Year in which document was published	139	.53	.70	634	.41	.59
	1 = <65	18	.76	.60	11	.32	1.05
	2 = 66-69	5	-.76	1.25	216	.50	.59
	3 = 70-72	24	.72	.78	123	.53	.61
	4 = 73-75	21	.65	.73	150	.16	.55
	5 = 76-80	55	.52	.50	45	.49	.49
	6 = 81+	16	.25	.55	89	.45	.44
I-4 SOURCE1	Type of publication	139	.53	.70	628	.42	.59
	0 = educational journal	61	.69	.76	314	.36	.66
	1 = medical journal	39	.37	.55	60	.76	.53
	3 = book	9	.40	.69	79	.41	.53
	4 = ERIC	14	.39	.31	23	.62	.30
	5 = dissertation/thesis	-	-	-	-	-	-
	7 = government report	16	.49	.92	112	.37	.39
	8 = other unpublished	-	-	-	40	.41	.53
II-1 AGEDV1	Mean age in months at which dependent variable measured. . .	118	.53	.73	616	.41	.59
	1 = 0-12 mos	15	.37	.57	26	.49	.56
	2 = 13-24	10	.50	.41	69	.33	.60
	3 = 25-36	18	.44	.71	63	.54	.49
	4 = 37-48	30	.56	.66	48	.74	.76
	5 = 49-54	13	.02	.66	17	.84	.65
	6 = 55-60	15	.71	.71	103	.43	.41
	7 = 61-66	7	.10	.34	22	.68	.50
	8 = 67-72	5	1.16	.43	51	.29	.46
	9 = 73-84	1	.39	.00	81	.43	.68
	10 = 85-96	1	.18	.00	56	.37	.52
	11 = 97-108	2	-1.94	1.14	23	.37	.42
	12 = 109+	1	-.16	.00	57	-.12	.48
	MISSING DATA	21					

the average value of 139 effect sizes for handicapped populations was .53 with a standard deviation of .70. The average value for 638 effect sizes from disadvantaged populations was .42 with a standard deviation of .59. These data suggest that on the average, collapsed across all types of studies, types of outcomes, and types of subjects, early intervention results in approximately a half a standard deviation gain. In other words, if accepted at face value, these data would indicate that the average child participating in an early intervention program would score at approximately the 69th percentile of a distribution of comparable children who did not participate in the early intervention program.

Still referring to Table 2.9 under the disadvantaged category, the data for "year in which the document was published" shows that the average value for the 11 effect sizes published before 1965 was .32, the average effect size for the 216 effect sizes published between 1966 and 1969 was .50, etc. Results such as these were used mainly in deciding which variables to examine further. Therefore, they are not discussed in detail in this report but are included in Appendix 2-H as a reference for the reader to cross check results and raise additional questions. The reader is encouraged to become familiar with the format and content of this appendix.

Average Standardized Mean Difference Effect Size for Key Variables

Using the data from the analyses contained in Appendix 2-H, the next step in the analysis was to examine the average effect size for key variables identified in previous literature. This was done by recombining categories to avoid problems of instability due to small numbers of Effect Sizes and computing averages for these new categories. For example, year in which the document was published was recombined into three categories (i.e, before

1969, 1970 through 1975, and 1975 and after) instead of the six categories originally created. This resulted in a larger number of effect sizes in each category and avoided problems of interpretation which result from instability. Obviously, other types of recombinations are possible and may lead to different interpretations of the results. Therefore, readers are encouraged to examine the influence of such combinations on variables in which they are particularly interested.

The average mean difference effect size for the key variables suggested from previous literature is shown in Table 2.10. Variables included in this table are in the same order as they appear on the coding sheet, although not all variables in the coding sheet are included in these results.

For some variables, it would have been theoretically advantageous to have been able to have categorized them differently than they appear in Table 2.10. For example, mean IQ prior to intervention is divided by those effect sizes which came from subjects below 85 and those above 85. A theoretically stronger breakdown would have been 0 to 40, 41 to 55, 56 to 70, 71 to 85, 86 to 100, and 101 to 115. However, breaking the data down in this way (which is the way it appears in Appendix 2-H) would have left less than ten effect sizes in two categories for the handicapped and three categories for the disadvantaged. Therefore, the breakdown shown in Table 2.10 was used. Because the estimates are based on greater numbers of effect sizes and studies when the variable is broken down in this way, results are more believable, and one can place more confidence in any differences which are identified.

Further Analyses of Key Variables

Based on the conclusions from the analysis of previous reviews and the data reported in Table 2.10, five key variables were selected for more in-depth analyses. These variables included:

Table 2.10

AVERAGE STANDARDIZED MEAN DIFFERENCE EFFECT SIZE FOR KEY VARIABLES FOR EARLY INTERVENTION META-ANALYSIS[a]

Year in Which Document Was Published

	Handicapped	Disadvantaged
< 69	.43 (23)	.49 (227)
70-75	.69 (45)	.33 (273)
75+	.46 (71)	.47 (133)

Mean Age in Months at Which Dependent Variable Measured

	Handicapped	Disadvantaged
0-24 mos	.42 (25)	.37 (95)
24-48 mos	.52 (48)	.63 (111)
49-60 mos	.85 (28)	.49 (120)
61+ mos	.18 (17)	.29 (290)

Mean IQ Prior to Intervention

	Handicapped	Disadvantaged
Below 85	.48 (37)	.65 (74)
Above 85	.59 (34)	.37 (381)

Size of Sample

	Handicapped	Disadvantaged
0-10	.70 (39)	.70 (85)
11-20	.54 (59)	.37 (207)
21-30	.42 (22)	.47 (144)
31-100	.20 (17)	.29 (192)

Source of Participants

	Handicapped	Disadvantaged
Solicited/ Volunteer	.42 (41)	.38 (475)
Referred	.46 (43)	.51 (46)
Captive	.86 (21)	.38 (51)

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[a] Numbers in parentheses indicate the number of effect sizes on which an average is based.

Severity of Handicapping Condition

	Handicapped
Borderline/Mild Moderate	.65 (44)
Severe/Profound	.31 (9)
Mixed	.49 (62)

Primary Handicapping Condition of Sample

Multiply Handicapped	- (1)	Other Health Impaired	.44 (4)
Hearing Impaired	- (0)	Emotionally Disturbed	.75 (7)
Visually Impaired	- (0)	General Developmental Delay	.68 (7)
Mentally Retarded	.43 (54)	At Risk (generally or medically)	.58 (20)
Speech/Language	.70 (5)	Disadvantaged	.41 (618)
Learning Disabled	- (0)	Other	1.08 (10)
Orthopedically Impaired	.35 (21)	Combination	.58 (28)

Percent of Sample Which is Black
(Disadvantaged Only)

0%	.35 (35)
1-50%	.53 (29)
50-90%	.50 (166)
90-100%	.47 (241)

(Disadvantaged Only)

	% From One-Parent Homes	% with Father Present in the Home
0-25%	.33 (50)	.43 (97)
26-50%	.45 (58)	
51-100%	.62 (53)	.42 (61)
76-100%		.28 (52)

Average Number of Children in Home (Includes Target Child)
(Disadvantaged Only)

< 2.0	.44 (488)
2.1 - 3.5	.33 (108)
3.6+	.32 (42)

Mothers: Average Number of Years Schooling Completed
(Disadvantaged Only)

< 10.0 grades	.43 (449)
10.1+ grades	.38 (189)

Mean Age When Intervention Was Started

	Handicapped	Handicapped	Disadvantaged
0-6 mos	.35 (56)	.49 (38)	.43 (135)
7-18 mos		.05 (18)	.39 (73)
19-36 mos	.49 (32)	.49 (32)	.48 (61)
36-48 mos	.82 (26)	.88 (11)	.42 (131)
48-60		.78 (17)	.37 (225)

Setting in Which Intervention Occurred

	Handicapped	Disadvantaged
Home	.41 (38)	.36 (116)
Classroom	.74 (32)	.44 (383)
Mixed	.48 (37)	.37 (117)

Degree to Which Intervention Was Tailored to Child

	Handicapped	Disadvantaged
None	.40 (48)	.42
Somewhat or Substantial	.61 (77)	.39

Involvement of Parent as Intervenor

	Handicapped	Disadvantaged
Not at all or minor	.59 (86)	.42 (461)
Major or only	.40 (47)	.38 (160)

Training of Primary Intervenor

	Handicapped	Disadvantaged
Certified	.78 (27)	.44 (299)
Not Certified	.47 (65)	.27 (244)

Total Hours of Intervention

(Hours Per Week X Number of Weeks)

	Handicapped	Disadvantaged
Small (0-50 hours)	.88 (14)	.66 (30)
Moderate (51-500)	.71 (15)	.50 (119)
Lots (500+)	.68 (9)	.55 (193)

Degree of Structure in Instructional Curriculum

(Disadvantaged Only)

Very	.50 (95)	.41 (460)
Somewhat	.39 (365)	
Not	.29 (75)	.29 (75)

To Whom Was Treatment Delivered?

	Handicapped	Disadvantaged
Child Only	.58 (77)	.41 (377)
Parent and Child Together	.49 (46)	.39 (227)

Were Parents Given Written Plan of Weekly Activities?

(Disadvantaged Only)

No	.17 (98)
Yes	.44 (90)

Child/Intervenor Ratio
(Applies only to Classrooms)

	Handicapped	Disadvantaged
Up to 1/1	.80 (28)	.61 (35)
4/1	.71 (13)	.33 (62)
8/1		.29 (176)
8+/1	.60 (11)	.24 (64)

Intended Involvement Parents/Family

	Handicapped	Disadvantaged
None	.84 (33)	.42 (280)
Moderate/ Some	.31 (27)	.42 (114)
Extensive	.49 (63)	.38 (216)

Funding for Program

	Handicapped	Disadvantaged
External Funds	.42 (82)	.39 (578)
No or Probably No	.66 (55)	.73 (48)

Continued Intervention After Preschool

(Disadvantaged Only)

No	.38 (129)
Yes	.16 (175)

Type of Experimental Design Used

	Handicapped	Disadvantaged
Random or Good Matching	.51 (40)	.39 (407)
Poor Matching, Pre/Post	.53 (92)	.46 (229)

Blinding of Data Collector

	Handicapped	Disadvantaged
Yes, Definitely	.50 (37)	.45 (183)
No, Definitely	.45 (24)	.56 (69)

Quality of Study

	Handicapped	Disadvantaged
1 & 2 (Good)	.39 (23)	.40 (185)
3	.47 (28)	.43 (226)
4 & 5 (Poor)	.58 (88)	.42 (227)

Construct Measured by Outcome Variable

	Handicapped	Disadvantaged
I.Q. (1-4)	.70 (47)	.4[illegible] (291)
Motor (5-8)	.46 (25)	.49 (39)
Language	.73 (14)	.50 (82)
Social Comp. 13,14,17,18	.42 (27)	.36 (27)
Illinois Test of Psycholinguistic Abilities (15)	.93 (2)	.65 (42)
Academic (16)	.48 (3)	.21 (98)
Other (19-23)	.50 (20)	.38 (60)

General Quality of Outcome Measure

	Handicapped	Disadvantaged
Good (1 and 2)	.54 (109)	.42 (586)
Fair (3)	.50 (20)	.33 (45)
Poor (4 and 5)	.56 (10)	.43 (7)

Months After Intervention Was Completed Outcome Measured

	Handicapped		Disadvantaged
Immediate	.54 (118)	.54 (118)	.57 (373)
1 to 12 mos	.43 (12)	.09 (6)	.33 (86)
13 to 24 mos.		.52 (2)	.31 (62)
25 to 36 mos.		.90 (4)	.28 (24)
37 to 60 mos.			-.02 (38)
60+ mos.			-.03 (49)

- Degree of structure in the intervention curriculum
- Involvement of parents in intervention programs
- Training of the primary intervenor
- Age at which intervention begins
- Maintenance of benefits resulting from early intervention programs

For each of these variables, a series of analyses were done to determine whether the data reported in Table 2.10 might be artifacts attributable to confounding with other variables. The best way to explain the analyses which were done for each of these variables is to go through the analyses for "Degree of Structure" step by step.

As will be recalled from Table 2.10, the data for disadvantaged populations with very structured programs had an average effect size of .50, somewhat structured programs an average effect size of .39, and programs with little or no structure had an average effect size of .29. These data suggest that more structured programs are more effective than less structured programs. However, it may be possible that degree of structure is confounded with other variables in such a way that these apparent differences are really attributable to some other variable.

For example, assume for the moment that quality of study is strongly related to magnitude of effect size (assume very poor studies generally find higher effect sizes than good studies) and all of the effect sizes in the very structured category came from poorly done studies, while all the effect sizes in the category with little or no structure came from very good studies. If this were the case, the higher average effect size for very structured programs could more plausibly be explained by the quality of the study rather than the degree of structure in the intervention program.

Table 2.11 shows the types of analyses done to check such alternative explanations. Panel A reproduces the average effect size for every level of "structure" (see numbers in the boxes), but also gives the standard error of the mean (defined as the observed standard deviation ÷ the square root of the number of effect sizes), the number of effect sizes on which the calculation is based, and the number of studies from which those effect sizes came. The standard error of the mean is useful in determining how confident one can be that differences between levels are attributable to more than sampling fluctuation. A good rule of thumb is that values which do not differ by more than two standard errors of the mean are more likely attributable to sampling fluctuation than to true differences. The number of studies from which ES's come is important because one would be less confident in the results of 50 ES's from two studies, than with 50 ES's from 25 studies.

Panel A also shows the average value for each of seven different key variables for each level of "degree of structure". These data are used to determine whether observed differences in "degree of structure" might be attributable to differences on other key variables. For example, the average age at which the outcome was measured for very structured programs was 66.5 months with information based on 93 of the 95 "very structured" effect sizes. The average age at which outcome was measured for somewhat structured programs was 69.4 with that data based on 357 of the 365 possible effect sizes. The average age at which outcome was measured for programs having little or no structure was 63.5 based on 73 of the 75 possible effect sizes. Thus, for this variable, there is little difference between age at which the outcome was measured for the three levels of "degree of structure". Continuing on down this list, there does seem to be substantial differences between time of measurement (months after treatment end) between the

TABLE 2.11

Further Analyses of Variables Associated With DEGREE OF STRUCTURE in the Intervention Procedure

FOR VARIABLE: DEGREE OF STRUCTURE (see variable III-8b)

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
VERY STRUCTURED	$\boxed{.50}$	.06	95	(17)
			$\bar{X}$	(n)
	Age Outcome Measured		66.5	(93)
	IQ at Beginning of Tmt.		94.4	(81)
	Age Treatment Began		40.6	(93)
	Degree of Structure		***	
	Quality of Study		3.38	(95)
	Quality of Outcome		1.39	(95)
	Time of Measurement (months after tmt. end)		14.1	(94)
SOMEWHAT STRUCTURED	$\boxed{.39}$	.03	365	(33)
			$\bar{X}$	(n)
	Age Outcome Measured		69.4	(357)
	IQ at Beginning of Tmt.		87.2	(253)
	Age Treatment Began		31.7	(357)
	Degree of Structure		***	
	Quality of Study		2.98	(365)
	Quality of Outcome		1.60	(365)
	Time of Measurement (months after tmt. end)		21.3	(365)
LITTLE OR NO STRUCTURE	$\boxed{.29}$	.06	75	(14)
			$\bar{X}$	(n)
	Age Outcome Measured		63.5	(73)
	IQ at Beginning of Tmt.		91.5	(73)
	Age Treatment Began		48.7	(73)
	Degree of Structure		***	
	Quality of Study		3.25	(75)
	Quality of Outcome		1.52	(75)
	Time of Measurement (months after tmt. end)		3.6	(73)

***Does not appear in this table because it is the same variable as the variable being analyzed.

Panel A

FOR VARIABLE:

DEGREE OF STRUCTURE (see variable III-8b)

	QUALITY OF STUDY			TYPE OF MEASURE						
		ES	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
VERY STRUCTURED ES .50 Se .06 n 95	Good	$\boxed{.59}$	(25)	.69 (12)	- (1)	- (3)		.69 (6)	- (3)	
	Fair	.16	(23)	.05 (7)		- (2)	- (4)	- (2)	.09 (7)	- (1)
	Poor	.62	(47)	.48 (25)	- (2)	- (3)		.90 (11)	- (4)	- (2)
SOMEWHAT STRUCTURED ES .39 Se .03 n 365	Good	$\boxed{.38}$	(129)	.48 (72)	- (4)	.35 (18)	- (2)	- (3)	.10 (16)	.30 (6)
	Fair	.46	(132)	.45 (56)	.31 (14)	.82 (12)	- (5)	.90 (7)	.40 (21)	.26 (17)
	Poor	.33	(104)	.39 (45)	.47 (7)	.48 (17)	- (2)	- (3)	.05 (25)	.53 (5)
LITTLE OR NO STRUCTURE ES .29 Se .06 n 75	Good	$\boxed{.12}$	(12)	- (3)		- (3)		- (3)	- (3)	
	Fair	.44	(34)	.68 (15)	.20 (5)	.27 (6)	- (3)	- (2)	- (2)	- (1)
	Poor	.18	(29)	.02 (13)	- (1)	.79 (7)		.09 (5)	- (2)	- (1)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

Panel B

TABLE 2.11 (continued)

FOR VARIABLE: Written Plan for Home Intervention
(see variable III-12d)

		DISADVANTAGED			
		ES	S_e	n_{es}	(n studies)
No Plan (0)		.17	.06	98	(10)
				$\bar{X}$	(n)
	Age Outcome Measured			72.33	(98)
	IQ at Beginning of Tmt.			91.84	(80)
	Age Treatment Began			30.06	(98)
	Degree of Structure			2.03	(98)
	Quality of Study			2.96	(98)
	Quality of Outcome			1.36	(98)
	Time of Measurement (months after tmt. end)			27.03	(98)
Yes Plan Written (1)		.44	.05	90	(7)
				$\bar{X}$	(n)
	Age Outcome Measured			50.26	(86)
	IQ at Beginning of Tmt.			89.76	(29)
	Age Treatment Began			14.60	(88)
	Degree of Structure			1.97	(90)
	Quality of Study			3.11	(90)
	Quality of Outcome			1.81	(90)
	Time of Measurement (months after tmt. end)			17.91	(90)
				$\bar{X}$	(n)
	Age Outcome Measured				
	IQ at Beginning of Tmt.				
	Age Treatment Began				
	Degree of Structure				
	Quality of Study				
	Quality of Outcome				
	Time of Measurement (months after tmt. end)				

Panel C

FOR VARIABLE: Written Plan for Home Intervention
(Disadvantaged -see variable
III-12d)

	ES	Se	n
No Plan (0)	.17	.06	98
Yes Plan Written (1)	.44	.05	90

	QUALITY OF STUDY	ES	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
No Plan (0)	Good	.29	(45)	.49 (19)	- (2)	.37 (12)			-.18 (12)	
	Fair	-.04	(16)	-.18 (8)			- (1)		.05 (6)	- (1)
	Poor	.12	(37)	-.06 (17)	.28 (5)	- (2)	- (2)		.05 (9)	- (2)
Yes Plan Written (1)	Good	.42	(37)	.38 (30)					.55 (7)	
	Fair	.49	(28)	.70 (18)	-.21 (7)			- (2)	- (1)	
	Poor	.42	(25)	.54 (15)				- (1)	.05 (7)	- (2)
	Good									
	Fair									
	Poor									

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

Panel D

TABLE 2.11 (continued)

Intervention A vs. Intervention B Comparisons of[a]:

DEGREE OF STRUCTURE
(more versus less)

	ES	S_e	$n_{\overline{ES}}$
Very Structured vs. Somewhat Structured	.18	.07	58
Very Structured vs. Not At All Structured	.53	.06	51
Somewhat Structured vs. Not At All Structured	.01	.07	22

[a] ES's from 5 studies.

Panel E

Intervention A vs Intervention B Comparisons

DEGREE OF STRUCTURE

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Panel F

different levels of "degree of structure". For very structured programs, the average time after the treatment ended in which measurement occurred was 14.1 months; for somewhat structure programs, 21.3 months; and for programs with little or no structure, 3.6 months. From other data in the analysis, we know that outcomes which are measured close to the end of the treatment tend to be somewhat higher than outcomes which are measured sometime after the treatment stops. Therefore, although there does appear to be some confounding between "degree of structure" and "time of measurement", eliminating the confounding would tend to further separate the groups than is now the case.

Panel B shows additional analyses by breaking "degree of structure" down by "quality of study" and "type of measure". This time, numbers in the boxes show the average value for studies coded as "good" for very structured, somewhat structured, or little or no structure. As can be seen, the general trend for more structured programs to result in higher effect sizes is maintained and in fact further emphasized by these data. Unfortunately, there are only 12 effect sizes for programs with little or no structure which had good research designs. The data are further broken down by the type of measure, so that if we limit the analysis to just IQ measures from very structured programs with good research designs, there is an average effect size of .69 based on 12 data points. Somewhat structured programs from studies having good research designs had an average effect size for IQ measures of .48 based on 72 effect sizes. There were only 3 IQ effect sizes from programs with little or no structure and good research designs, so this number is deleted from the table (values based on fewer than 5 effect sizes were deleted). However, the trend for more highly structured programs to result in higher effect sizes is maintained with the difference of .21 between very structured and somewhat structured programs. Further analysis shows that the number and type of outcomes in each of these categories is very similar across the three degrees of structure.

Another variable coded in the meta-analysis which provides additional information on the question of how degree of structure is related to intervention effectiveness, is whether the average effect size associated with home intervention programs provided a written plan for intervention to the parents. It was our assumption that programs which provided written instruction (including schedules and criteria for progression and mastery) were more structured than programs which did not. As can be seen in Panel C, the average effect size for those programs which did provide such plans was .44 as opposed to .17 for programs which did not. Analyses of the average values on the key variables (also shown in Panel C) suggest that the average effect size for programs with written plans may be somewhat inflated since average time of measurement was 10 months earlier, studies were slightly well less done, and treatment began somewhat earlier. In general, however, these data support the information in Panels A and B. Panel D provides a similar analysis for "written plan for home intervention" as Panel B provided for "degree of structure". When the analysis is limited to only good studies, the size of differences are somewhat reduced but the differences are in the same direction (i.e., favoring programs with written plans).

Finally, Panel E shows the results of those studies which made within study comparisons of degree of structure. In other words, there were five studies included in the meta-analysis (see references in Panel F) which made a direct comparison between two or more interventions, one of which was more structured and one of which was less structured. As can be seen in Panel E, more structured programs resulted in more effective outcomes than less structured programs. The most striking difference is the comparison of very structured programs versus programs which were not at all structured, showing an effect size difference of .53 based on 51 effect sizes.

As these analyses demonstrate, the integration of previous research to provide information about questions such as how degree of structure is related to intervention effectiveness is a complex task which requires extensive cross-checking of the data and exploration of alternative hypotheses. The data presented in Table 2.11 represent a much more complete analysis than has ever yet been reported in the literature. However, more analyses are possible and need to be conducted before we can be completely confident of the results.

Similar analyses to those reported in Table 2.11 are reported in Table 2.12 for involvement of parents in intervention programs, Table 2.13 for training of primary intervenor, Table 2.14 for age at which intervention begins, and Table 2.15 for maintenance of benefits resulting from early intervention programs. Each of these tables is organized in the same way as Table 2.11, with the exception that not all variables were addressed in the meta-analysis literature with intervention A vs. intervention B studies.

DISCUSSION AND CONCLUSIONS

Although additional data will be added to the meta-analysis during 1983-84, some tentative conclusions are now possible based on the data currently available. These conclusions should be regarded as preliminary because more analyses are underway and additional data will be considered in the future. However, it should also be remembered that the current data set already includes more than four times as many studies as has ever been included in any single review of early intervention. Therefore, even though

TABLE 2.12

Further Analyses of Variables Associated With
INVOLVEMENT OF PARENTS in Intervention
Programs

FOR VARIABLE: Intended Involvement of Parents
(see variable III-17)

	HANDICAPPED				DISADVANTAGED			
	$\overline{ES}$	S_e	n_{es}	(n studies)	$\overline{ES}$	S_e	n_{es}	(n studies)
EXTENSIVE	$\boxed{.49}$	.08	63	23	$\boxed{.38}$	.04	216	(23)
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		43.07	(55)	Age Outcome Measured		47.50	(208)
	IQ at Beginning of Tmt.		87.60	(40)	IQ at Beginning of Tmt.		95.08	(129)
	Age Treatment Began		22.43	(53)	Age Treatment Began		17.50	(210)
	Degree of Structure		1.74	(42)	Degree of Structure		1.99	(166)
	Quality of Study		3.84	(63)	Quality of Study		3.16	(216)
	Quality of Outcome		1.97	(63)	Quality of Outcome		1.82	(216)
	Time of Measurement (months after tmt. end)		2.11	(57)	Time of Measurement (months after tmt. end)		14.89	(216)
MODERATE/SOME	$\boxed{.31}$	.07	27	10	$\boxed{.42}$	.05	114	(11)
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		34.43	(23)	Age Outcome Measured		77.68	(114)
	IQ at Beginning of Tmt.		70.14	(7)	IQ at Beginning of Tmt.		82.93	(85)
	Age Treatment Began		19.00	(23)	Age Treatment Began		35.79	(112)
	Degree of Structure		2.17	(6)	Degree of Structure		1.98	(96)
	Quality of Study		3.63	(27)	Quality of Study		3.25	(114)
	Quality of Outcome		2.41	(27)	Quality of Outcome		1.61	(114)
	Time of Measurement (months after tmt. end)		0.00	(24)	Time of Measurement (months after tmt. end)		17.58	(114)
NONE	$\boxed{.84}$	.11	38	14	$\boxed{.42}$	.04	280	(34)
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		45.38	(29)	Age Outcome Measured		72.79	(268)
	IQ at Beginning of Tmt.		72.88	(16)	IQ at Beginning of Tmt.		90.40	(228)
	Age Treatment Began		38.72	(29)	Age Treatment Began		45.61	(278)
	Degree of Structure		2.00	(18)	Degree of Structure		1.95	(266)
	Quality of Study		3.71	(38)	Quality of Study		3.14	(280)
	Quality of Outcome		1.58	(38)	Quality of Outcome		1.46	(280)
	Time of Measurement (months after tmt. end)		2.08	(38)	Time of Measurement (months after tmt. end)		15.92	(277)

TABLE 2.12 (continued)

FOR VARIABLE: Intended Involvement of Parents
(Handicapped-- see variable III-17)

	QUALITY OF STUDY	$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Extensive $\overline{ES}$ .49 Se .08 n 63	Good	.23	(10)	.10 (6)	- (1)		- (1)			- (2)
	Fair	.45	(15)	- (2)	- (2)		- (2)		- (1)	.04 (7)
	Poor	.60	(36)	.67 (19)	.26 (8)	- (4)	- (1)	- (2)		- (2)
Moderate $\overline{ES}$ .31 Se .07 n 27	Good	.35	(5)				.35 (5)			
	Fair	.14	(5)				.14 (5)			
	Poor	.34	(17)	- (4)	- (4)	- (2)	.. (1)		- (1)	.34 (5)
Some $\overline{ES}$ .84 Se .11 n 38	Good	.63	(8)	- (2)	- (2)		- (4)			
	Fair	.78	(7)			- (2)	- (2)			- (3)
	Poor	.93	(23)	1.08 (10)	93 (5)	- (4)	- (2)		- (1)	- (1)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

FOR VARIABLE: Intended Involvement of Parents
(Disadvantaged--see variable III-17)

	QUALITY OF STUDY	$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Extensive $\overline{ES}$ .38 Se .04 n 216	Good	.45	(60)	.42 (41)	- (1)	- (3)	- (2)		.52 (8)	.39 (5)
	Fair	.41	(92)	.45 (41)	-.05 (10)	.60 (10)	.69 (7)	- (2)	.15 (10)	.46 (12)
	Poor	.29	(64)	.19 (34)	- (3)	.86 (6)	- (2)	- (1)	-.02 (10)	.50 (8)
Moderate/Some $\overline{ES}$ .42 Se .05 n 114	Good	.32	(50)	.53 (20)	- (1)	.31 (13)	- (1)		-.18 (14)	- (1)
	Fair	.43	(15)	.45 (9)	- (1)			- (2)		- (3)
	Poor	.52	(49)	.70 (16)	- (3)	.45 (13)	- (2)		.20 (8)	.68 (7)
None $\overline{ES}$ .44 Se .04 n 280	Good	.40	(65)	.50 (25)	- (4)	.20 (8)	- (2)	.62 (12)	.22 (9)	.20 (5)
	Fair	.43	(111)	.45 (35)	.56 (10)	.53 (15)	.02 (10)	.78 (7)	.44 (21)	.33 (13)
	Poor	.41	(104)	.37 (53)	1.23 (6)	.58 (8)		.57 (18)	.10 (15)	- (4)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.12 (continued)

FOR VARIABLE: Involvement of Parent as Intervenor (see variable III-4A)

	HANDICAPPED				DISADVANTAGED			
	$\overline{ES}$	S_e	n_{es}	(n studies)	$\overline{ES}$	S_e	n_{es}	(n studies)
Minor or not at all	$\boxed{.59}$	.063	86		$\boxed{.42}$	.028	461	
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		50.23	(74)	Age Outcome Measured		70.69	(443)
	IQ at Beginning of Tmt.		83.35	(46)	IQ at Beginning of Tmt.		89.09	(361)
	Age Treatment Began		31.79	(75)	Age Treatment Began		40.78	(451)
	Degree of Structure		1.95	(42)	Degree of Structure		1.96	(407)
	Quality of Study		3.73	(86)	Quality of Study		3.15	(461)
	Quality of Outcome		1.99	(86)	Quality of Outcome		1.52	(461)
	Time of Measurement (months after tmt. end)		1.21	(85)	Time of Measurement (months after tmt. end)		15.3	(456)
Major or only	$\boxed{.40}$	.058	47		$\boxed{.38}$	.044	160	
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		32.79	(38)	Age Outcome Measured		46.21	(156)
	IQ at Beginning of Tmt.		78.16	(19)	IQ at Beginning of Tmt.		95.68	(82)
	Age Treatment Began		10.14	(35)	Age Treatment Began		13.34	(158)
	Degree of Structure		1.63	(22)	Degree of Structure		2.01	(125)
	Quality of Study		3.79	(47)	Quality of Study		3.21	(160)
	Quality of Outcome		1.79	(47)	Quality of Outcome		1.94	(160)
	Time of Measurement (months after tmt. end)		2.46	(39)	Time of Measurement (months after tmt. end)		16.59	(160)

TABLE 2.11 (continued)

FOR VARIABLE: Involvement of Parent as Intervenor
(Handicapped--see variable III-4a)

					TYPE OF MEASURE						
			$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Minor or not at all $\overline{ES}$ .60 Se .065 n 84	QUALITY OF STUDY	Good	$\boxed{.38}$	(17)	.10 (8)	- (3)		1.19 (5)			- (1)
		Fair	.50	(18)		- (1)	- (2)	- (4)		- (1)	.30 (10)
		Poor	.71	(49)	1.01 (19)	.78 (9)	.62 (8)	-.17 (6)	- (2)	- (2)	- (3)
Major or only $\overline{ES}$ .40 Se .058 n 47		Good	$\boxed{.43}$	(6)				.352 (5)			- (1)
		Fair	.46	(9)	- (3)	- (1)		.05 (5)			
		Poor	.37	(32)	.40 (16)	.24 (9)	- (2)	- (2)			- (3)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

FOR VARIABLE: Involvement of Parent as Intervenor
(Disadvantaged--see variable III-4a)

					TYPE OF MEASURE						
			$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Minor or not at all $\overline{ES}$ .42 Se .03 n 461	QUALITY OF CONTROL	Good	$\boxed{.39}$	(127)	.57 (56)	.38 (5)	.31 (24)	- (2)	.62 (12)	-.02 (23)	.20 (5)
		Fair	.44	(170)	.42 (63)	.57 (13)	.58 (21)	.25 (15)	.79 (9)	.36 (28)	.34 (21)
		Poor	.43	(164)	.39 (76)	.99 (9)	.51 (26)	- (2)	.57 (18)	-.01 (19)	.45 (14)
Major or only $\overline{ES}$ .38 Se .01 n 160		Good	$\boxed{.42}$	(54)	.33 (36)	- (1)		- (3)		.52 (8)	.69 (6)
		Fair	.41	(50)	.60 (24)	-.16 (8)	- (4)	- (2)	- (2)	- (3)	.32 (7)
		Poor	.32	(56)	.34 (29)	- (3)	- (3)	- (2)	- (1)	.10 (13)	.38 (5)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.12 (continued)

FOR VARIABLE: To whom was treatment delivered?
(see variable III-10)

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
Child only	.41	.03	377	(42)
			X̄	(n)
	Age Outcome Measured		74.03	(359)
	IQ at Beginning of Tmt.		88.31	(300)
	Age Treatment Began		44.77	(368)
	Degree of Structure		1.97	(341)
	Quality of Study		3.08	(377)
	Quality of Outcome		1.49	(377)
	Time of Measurement (months after tmt. end)		15.19	(371)
Parent and Child	.39	.03	277	(28)
			X̄	(n)
	Age Outcome Measured		50.52	(223)
	IQ at Beginning of Tmt.		94.76	(124)
	Age Treatment Began		15.73	(225)
	Degree of Structure		1.97	(179)
	Quality of Study		3.34	(227)
	Quality of Outcome		1.80	(227)
	Time of Measurement (months after tmt. end)		17.27	(227)
			X̄	(n)
	Age Outcome Measured			
	IQ at Beginning of Tmt.			
	Age Treatment Began			
	Degree of Structure			
	Quality of Study			
	Quality of Outcome			
	Time of Measurement (months after tmt. end)			

FOR VARIABLE: To whom was treatment delivered?
(Disadvantaged--see variable III-10)

		ES	(n)	TYPE OF MEASURE						
				IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Child only ES .41 Se .03 n 377	Good	.37	(113)	.51 (46)	.52 (5)	.29 (22)	- (3)	.62 (12)	-.10 (19)	.53 (6)
	Fair	.47	(137)	.50 (50)	.54 (11)	.61 (10)	.04 (6)	.79 (9)	.42 (23)	.27 (19)
	Poor	.38	(127)	.38 (60)	.88 (5)	.44 (20)		.57 (18)	.12 (17)	.00 (7)
Parent and Child ES .39 Se .03 n 227	Good	.48	(65)	.48 (45)	- (1)	- (4)	- (2)		.52 (8)	.39 (5)
	Fair	.28	(69)	.24 (34)	.02 (10)	- (3)	.72 (6)		.11 (8)	.44 (8)
	Poor	.40	(93)	.34 (44)	.29 (6)	.90 (10)	- (4)	- (1)	.05 (16)	.68 (12)
ES Se n	Good									
	Fair									
	Poor									

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

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TABLE 2.12 (continued)

FOR VARIABLE: Settings of Intervention (see variable III-2)

	HANDICAPPED				DISADVANTAGED			
	$\overline{ES}$	S_e	n_{es}	(n studies)	$\overline{ES}$	S_e	n_{es}	(n studies)
HOME	$\boxed{.41}$	.09	38	(11)	$\boxed{.36}$	.05	116	(19)
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		37.83	(36)	Age Outcome Measured		40.43	(116)
	IQ at Beginning of Tmt.		77.32	(9)	IQ at Beginning of Tmt.		94.00	(65)
	Age Treatment Began		18.77	(35)	Age Treatment Began		15.24	(114)
	Degree of Structure		1.88	(8)	Degree of Structure		2.00	(96)
	Quality of Study		2.84	(38)	Quality of Study		2.99	(116)
	Quality of Outcome		2.18	(38)	Quality of Outcome		1.93	(116)
	Time of Measurement (months after tmt. end)		.16	(37)	Time of Measurement (months after tmt. end)		11.81	(116)
CLASSROOM	$\boxed{.74}$	.12	32	(16)	$\boxed{.44}$	.03	383	(44)
			$\overline{X}$	(n)			$\overline{X}$	(n)
			45.48	(25)				
	Age Outcome Measured		71.50	(4)	Age Outcome Measured		71.36	(375)
	IQ at Beginning of Tmt.		40.04	(25)	IQ at Beginning of Tmt.		90.07	(303)
	Age Treatment Began		1.82	(22)	Age Treatment Began		41.37	(374)
	Degree of Structure		4.00	(32)	Degree of Structure		1.95	(326)
	Quality of Study		2.13	(32)	Quality of Study		3.17	(383)
	Quality of Outcome				Quality of Outcome		1.59	(383)
	Time of Measurement (months after tmt. end)		1.23	(31)	Time of Measurement (months after tmt. end)		15.46	(379)
MIXED	$\boxed{.48}$	.11	37	(13)	$\boxed{.37}$	.05	117	(12)
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		42.72	(32)	Age Outcome Measured		67.53	(113)
	IQ at Beginning of Tmt.		91.47	(30)	IQ at Beginning of Tmt.		88.06	(80)
	Age Treatment Began		18.32	(34)	Age Treatment Began		28.78	(115)
	Degree of Structure		1.77	(30)	Degree of Structure		1.96	(113)
	Quality of Study		4.30	(37)	Quality of Study		3.22	(117)
	Quality of Outcome		1.95	(37)	Quality of Outcome		1.43	(117)
	Time of Measurement (months after tmt. end)		3.26	(35)	Time of Measurement (months after tmt. end)		20.21	(117)

TABLE 2.12 (continued)

FOR VARIABLE: Setting of Intervention
(Handicapped--see variable III-2)

Setting	Quality of Study	$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Home $\overline{ES}$ .41 Se .09 n 38	Good	$\boxed{.27}$	(15)	.10 (6)	- (1)		.45 (6)			- (2)
	Fair	.56	(12)	- (3)	- (2)		.28 (6)			- (1)
	Poor	.43	(11)	.35 (6)	- (2)	- (2)	- (1)			
Classroom $\overline{ES}$ .74 Se .12 n 32	Good	$\boxed{1.25}$	(4)				- (4)			
	Fair	.78	(8)			- (2)	- (3)			- (3)
	Poor	.62	(20)	1.03 (7)	- (2)	- (4)	- (1)	- (1)	- (1)	- (3)
Mixed $\overline{ES}$ .49 Se .11 n 36	Good	$\boxed{}$								
	Fair	.01	(7)						- (1)	-.02 (6)
	Poor	.61	(29)	.74 (13)	.24 (8)	- (4)		- (1)		- (3)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

FOR VARIABLE: Settings of Intervention
(Disadvantaged--see variable III-2)

Setting	Quality of Study	$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Home $\overline{ES}$ .36 Se .05 n 116	Good	$\boxed{.47}$	(34)	.44 (26)	- (1)	- (2)		- (1)	- (3)	- (1)
	Fair	.34	(52)	.47 (29)	-.16 (8)	- (4)	- (2)	- (2)	- (1)	.17 (6)
	Poor	.27	(30)	.02 (11)	- (3)	.79 (7)			- (3)	.39 (6)
Classroom $\overline{ES}$ .44 Se .03 n 383	Good	$\boxed{.43}$	(92)	.58 (40)	- (4)	.26 (14)	- (4)	.66 (11)	.16 (12)	.21 (7)
	Fair	.47	(156)	.47 (55)	.57 (13)	.59 (21)	.25 (14)	.76 (7)	.44 (23)	.35 (23)
	Poor	.41	(135)	.36 (65)	.88 (5)	.44 (20)	- (2)	.57 (19)	.12 (17)	.43 (7)
Mixed $\overline{ES}$ .37 Se .05 n 117	Good	$\boxed{.26}$	(53)	.37 (27)		.34 (10)			.03 (16)	
	Fair	.33	(18)	.45 (6)		- (1)	- (1)	- (2)	.06 (7)	- (1)
	Poor	.51	(46)	.62 (21)	- (3)	- (3)	- (2)		.07 (13)	- (4)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.12 (continued)

Intervention A vs. Intervention B Comparisons of[a]:

DEGREE OF PARENTAL INVOLVEMENT

(More versus Less)

	$\overline{ES}$	S_e	n_{ES}
All Comparisons No Parent vs. Parent or Less vs. More	.38	.05	134
Gordon Study Only Major Intervenor vs. Only Intervenor	.18	.06	70
All Comparisons Except Gordon Study No Parent vs. Parent or Less vs. More	-.06	.09	64

[a] ES's from 9 studies.

Intervention A vs Intervention B Comparisons

DEGREE OF PARENTAL INVOLVEMENT

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TABLE 2.13

Further Analyses of Variables Associated With TRAINING OF PRIMARY INTERVENOR Delivering Intervention Services

FOR VARIABLE: TRAINING OF PRIMARY INTERVENOR--(see variable III-5)

	HANDICAPPED				DISADVANTAGED			
	$\overline{ES}$	S_e	n_{es}	(n studies)	$\overline{ES}$	S_e	n_{es}	(n studies)
CERTIFIED	$\boxed{.78}$	.09	27	14	$\boxed{.44}$	.03	299	37
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		50.31	(16)	Age Outcome Measured		66.41	(292)
	IQ at Beginning of Tmt.		70.90	(10)	IQ at Beginning of Tmt.		88.77	(408)
	Age Treatment Began		48.65	(17)	Age Treatment Began		39.49	(293)
	Degree of Structure		1.94	(17)	Degree of Structure		1.99	(279)
	Quality of Study		4.19	(27)	Quality of Study		2.93	(299)
	Quality of Outcome		1.67	(27)	Quality of Outcome		1.57	(299)
	Time of Measurement (months after tmt. end)		1.46	(26)	Time of Measurement (months after tmt. end)		8.08	(243)
NOT CERTIFIED	$\boxed{.47}$	.09	65	21	$\boxed{.27}$	.02	244	30
			$\overline{X}$	(n)			$\overline{X}$	(n)
	Age Outcome Measured		42.84	(56)	Age Outcome Measured		61.66	(239)
	IQ at Beginning of Tmt.		85.69	(33)	IQ at Beginning of Tmt.		92.59	(248)
	Age Treatment Began		14.87	(53)	Age Treatment Began		24.94	(242)
	Degree of Structure		1.84	(37)	Degree of Structure		1.88	(203)
	Quality of Study		3.54	(65)	Quality of Study		3.33	(244)
	Quality of Outcome		1.92	(65)	Quality of Outcome		1.70	(244)
	Time of Measurement (months after tmt. end)		2.68	(57)	Time of Measurement (months after tmt. end)		25.50	(243)

TABLE 2.13 (continued)

FOR VARIABLE: TRAINING OF PRIMARY INTERVENOR
(Handicapped--see variable III-5)

	QUALITY OF STUDY	$\overline{ES}$	(n)	TYPE OF MEASURE						
				IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Certified $\overline{ES}$ .78 Se .09 n 25	Good	$\boxed{.83}$	(25)	.71 (6)		- (2)	- (1)			
	Fair									
	Poor	.86	(19)	.54 (6)	- (4)	- (4)	- (1)	- (1)	- (1)	- (1)
Not Certified $\overline{ES}$ .47 Se .09 n 75	Good	$\boxed{.39}$	(14)	.10 (6)			.58 (7)			- (1)
	Fair	.26	(16)	- (3)	- (1)		.05 (5)		- (1)	-.02 (6)
	Poor	.60	(35)	.84 (17)	.15 (8)	- (4)	- (2)	- (1)		- (3)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

FOR VARIABLE: TRAINING OF PRIMARY INTERVENOR
(Disadvantaged--see variable III-5)

	QUALITY OF STUDY	$\overline{ES}$	(n)	TYPE OF MEASURE						
				IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Certified $\overline{ES}$ .44 Se .03 n 299	Good	$\boxed{.40}$	(120)	.61 (50)	.38 (5)	.31 (26)	- (2)	.75 (9)	-.02 (23)	.20 (5)
	Fair	.43	(87)	.54 (36)	- (1)	.61 (13)	.06 (11)	- (3)	.37 (8)	.21 (15)
	Poor	.50	(92)	.59 (38)	.42 (5)	.48 (20)		.54 (15)	.28 (5)	.29 (9)
Not Certified $\overline{ES}$ .27 Se .02 n 244	Good	$\boxed{.40}$	(63)	.33 (44)	- (1)		- (3)	- (1)	.52 (8)	.69 (6)
	Fair	.24	(75)	.29 (36)	.06 (10)	- (3)	- (2)	- (2)	.06 (16)	.38 (6)
	Poor	.21	(106)	.09 (52)	.67 (6)	.99 (5)	- (2)	- (4)	.05 (28)	.48 (9)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.14

Further Analyses of Variables Associated With
AGE AT WHICH INTERVENTION BEGAN

FOR VARIABLE: Age at Start--(see variable III-1)

	HANDICAPPED			
	$\overline{ES}$	S_e	n_{es}	(n studies)
0-18 months	$\boxed{.35}$	.10	56	(13)
			$\overline{X}$	(n)
	Age Outcome Measured		33.88	(56)
	IQ at Beginning of Tmt.		85.84	(37)
	Age Treatment Began		-	-
	Degree of Structure		2.00	(24)
	Quality of Study		3.73	(56)
	Quality of Outcome		1.98	(56)
	Time of Measurement (months after tmt. end)		2.18	(56)
18-36 months	$\boxed{.49}$	.11	32	(12)
			$\overline{X}$	(n)
	Age Outcome Measured		43.45	(31)
	IQ at Beginning of Tmt.		66.38	(16)
	Age Treatment Began		-	-
	Degree of Structure		1.45	(11)
	Quality of Study		3.91	(32)
	Quality of Outcome		2.22	(32)
	Time of Measurement (months after tmt. end)		1.22	(32)
36-66 months	$\boxed{.89}$	.13	26	(13)
			$\overline{X}$	(n)
	Age Outcome Measured		57.88	(26)
	IQ at Beginning of Tmt.		92.00	(13)
	Age Treatment Began		-	-
	Degree of Structure		1.87	(15)
	Quality of Study		3.54	(26)
	Quality of Outcome		2.00	(26)
	Time of Measurement (months after tmt. end)		0.00	(26)

TABLE 2.14 (continued)

FOR VARIABLE: Age at Start (see variable III-1)

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
0-6 months	.43	.04	135	(12)
			$\bar{X}$	(n)
	Age Outcome Measured		38.96	(133)
	IQ at Beginning of Tmt.		109.60	(20)
	Age Treatment Began		-	-
	Degree of Structure		1.94	(89)
	Quality of Study		2.83	(135)
	Quality of Outcome		1.87	(135)
	Time of Measurement (months after tmt. end)		12.47	(133)
6-18 months	.39	.07	73	(14)
			$\bar{X}$	(n)
	Age Outcome Measured		35.07	(73)
	IQ at Beginning of Tmt.		92.55	(55)
	Age Treatment Began		-	-
	Degree of Structure		1.99	(69)
	Quality of Study		3.12	(73)
	Quality of Outcome		1.78	(73)
	Time of Measurement (months after tmt. end)		8.93	(73)
18-36 months	.48	.07	61	(12)
			$\bar{X}$	(n)
	Age Outcome Measured		60.13	(55)
	IQ at Beginning of Tmt.		88.67	(39)
	Age Treatment Began		-	-
	Degree of Structure		1.90	(50)
	Quality of Study		3.61	(61)
	Quality of Outcome		1.67	(61)
	Time of Measurement (months after tmt. end)		21.85	(61)

FOR VARIABLE: Age at Start

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
36-48 months	.42	.06	131	(19)
			$\bar{X}$	(n)
	Age Outcome Measured		72.71	(129)
	IQ at Beginning of Tmt.		87.53	(127)
	Age Treatment Began		-	-
	Degree of Structure		1.95	(120)
	Quality of Study		2.54	(131)
	Quality of Outcome		1.61	(131)
	Time of Measurement (months after tmt. end)		8.74	(131)
48-66 months	.37	.04	225	(20)
			$\bar{X}$	(n)
	Age Outcome Measured		85.48	(221)
	IQ at Beginning of Tmt.		90.14	(204)
	Age Treatment Began		-	-
	Degree of Structure		1.98	(195)
	Quality of Study		3.65	(225)
	Quality of Outcome		1.44	(225)
	Time of Measurement (months after tmt. end)		21.52	(225)

TABLE 2.14 (continued)

FOR VARIABLE: Age at Start
(Handicapped--(see variable III-1)

	QUALITY OF STUDY	ES (n)	TYPE OF MEASURE						
			IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
0-18 months ES .35 Se .10 n 56	Good	$\boxed{.43}$ (6)				.35 (5)			- (1)
	Fair	.18 (15)	- (2)	- (1)		.05 (5)		- (1)	-.02 (6)
	Poor	.41 (35)	.48 (17)	.34 (6)	.82 (5)	- (3)	- (1)		- (3)
18-36 months ES .49 Se .11 n 32	Good	$\boxed{.07}$ (10)	.10 (8)	- (2)					
	Fair								
	Poor	.68 (22)	1.14 (8)	- (4)	- (4)	- (2)		- (1)	- (3)
36-66 months ES .89 Se .13 n 26	Good	$\boxed{.92}$ (6)		- (1)		- (4)			- (1)
	Fair	.82 (7)		- (1)	- (1)	- (4)			- (1)
	Poor	.90 (13)	1.03 (6)		- (3)	- (2)	- (1)	- (1)	

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.14 (continued)

FOR VARIABLE: Age at Start
(Disadvantaged--(see variable III-I)

					TYPE OF MEASURE						
					IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
			$\overline{ES}$	(n)							
0-6 months $\overline{ES}$ .43 Se .04 n 135	QUALITY OF STUDY	Good	**.47**	(62)	.50 (38)	- (4)		.22 (5)		.53 (5)	.43 (10)
		Fair	.36	(42)	.22 (14)	.05 (7)	- (1)	.68 (7)		- (1)	.52 (12)
		Poor	.44	(31)	.69 (7)		- (2)	- (4)		.11 (10)	.32 (8)
6-18 months $\overline{ES}$ .39 Se .07 n 73		Good	**.55**	(22)	.52 (14)	- (2)	- (2)		- (1)	- (2)	- (1)
		Fair	.29	(25)	.42 (10)	.34 (6)	- (2)	- (2)		- (2)	- (3)
		Poor	.34	(26)	.38 (16)	.28 (5)	- (1)			- (2)	- (2)
18-36 months $\overline{ES}$ .48 Se .07 n 61		Good	**.35**	(7)	.36 (6)					- (1)	
		Fair	.63	(26)	.69 (17)		- (4)		- (1)	- (2)	- (2)
		Poor	.38	(28)	.28 (20)	- (1)				- (1)	.75 (6)
			$\overline{ES}$	(n)							
36-48 months $\overline{ES}$ .42 Se .06 n 131	QUALITY OF CONTROL	Good	**.35**	(67)	.55 (25)		.23 (17)		.74 (9)	-.07 (16)	
		Fair	.25	(38)	.51 (11)		- (2)	-.09 (8)	- (2)	- (4)	-.04 (11)
		Poor	.83	(26)	.88 (8)	- (1)	.48 (15)		- (2)		
48-66 months $\overline{ES}$ .37 Se .04 n 225		Good	**.26**	(25)	.25 (11)		.46 (7)			.09 (7)	
		Fair	.44	(87)	.35 (35)	.47 (8)	.63 (13)		.78 (7)	.34 (22)	- (2)
		Poor	.33	(113)	.30 (56)	.88 (5)	.53 (9)		.38 (17)	.22 (23)	- (3)

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

TABLE 2.14 (continued)

Intervention A vs. Intervention B Comparisons of[a]:

AGE AT WHICH INTERVENTION BEGINS

(Younger versus Older)

	$\overline{ES}$	S_e	n_{ES}
All Comparisons	.08	.05	104
Gordon Study IQ Only	.09	.08	62
Gordon Study Caldwell Preschool HOME	.02	.09	28

[a] ES's from 7 studies.

Intervention A vs Intervention B Comparisons

AGE AT WHICH INTERVENTION BEGINS

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TABLE 2.15

Further Analyses of Variables Associated with MAINTENANCE OF BENEFITS Resulting from Early Intervention Programs

FOR VARIABLE: Time after Intervention,
Outcome Measured
(Disadvantaged--(see variable V-12)

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
24-36	.28	.07	62	(21)
			$\bar{X}$	(n)
	Age Outcome Measured		78.83	(24)
	IQ at Beginning of Tmt.		86.36	(11)
	Age Treatment Began		28.46	(24)
	Degree of Structure		1.96	(24)
	Quality of Study		2.83	(24)
	Quality of Outcome		1.58	(24)
	Time of Measurement (months after tmt. end)			
36-60	-.02	.09	38	(7)
			$\bar{X}$	(n)
	Age Outcome Measured		99.61	(38)
	IQ at Beginning of Tmt.		86.77	(30)
	Age Treatment Began		34.74	(38)
	Degree of Structure		1.89	(38)
	Quality of Study		2.71	(38)
	Quality of Outcome		1.76	(38)
	Time of Measurement (months after tmt. end)			
60+	-.03	.07	49	(4)
			$\bar{X}$	(n)
	Age Outcome Measured		136.43	(49)
	IQ at Beginning of Tmt.		93.29	(31)
	Age Treatment Began		34.88	(49)
	Degree of Structure		1.84	(49)
	Quality of Study		4.02	(49)
	Quality of Outcome		1.49	(49)
	Time of Measurement (months after tmt. end)			

	DISADVANTAGED			
	ES	S_e	n_{es}	(n studies)
Immediate	.57	.03	373	(64)
			$\bar{X}$	(n)
	Age Outcome Measured		47.11	(356)
	IQ at Beginning of Tmt.		91.25	(280)
	Age Treatment Began		32.39	(364)
	Degree of Structure		1.95	(292)
	Quality of Study		3.10	(373)
	Quality of Outcome		1.57	(373)
	Time of Measurement (months after tmt. end)			
1-12	.33	.05	86	(18)
			$\bar{X}$	(n)
	Age Outcome Measured		65.74	(86)
	IQ at Beginning of Tmt.		89.48	(58)
	Age Treatment Began		39.17	(86)
	Degree of Structure		2.11	(71)
	Quality of Study		3.40	(86)
	Quality of Outcome		1.76	(86)
	Time of Measurement (months after tmt. end)			
12-24	31	.05	62	(21)
			$\bar{X}$	(n)
	Age Outcome Measured		75.48	(62)
	IQ at Beginning of Tmt.		86.35	(43)
	Age Treatment Began		36.69	(62)
	Degree of Structure		1.97	(58)
	Quality of Study		2.98	(62)
	Quality of Outcome		1.87	(62)
	Time of Measurement (months after tmt. end)			

TABLE 2.15 (continued)

FOR VARIABLE: Time after Intervention, Outcome Measured (Disadvantaged--(see variable V-12)

					TYPE OF MEASURE						
			$\overline{ES}$	(n)	IQ (3)	Motor (7)	Language (10)	Social Compet. (13)	ITPA (15)	Academic (16)	Other (23)
Immediate $\overline{ES}$ .57 Se .03 n 373	Quality of Study	Good	.51	(118)	.54 (65)	.61 (6)	.42 (19)	.22 (5)	.67 (11)	- (3)	.50 (9)
		Fair	.57	(125)	.73 (39)			.29 (17)	1.07 (7)	.89 (5)	.35 (23)
		Poor	.62	(130)	.58 (68)	.86 (10)	.66 (18)		.57 (18)	.70 (6)	.65 (10)
1-12 months $\overline{ES}$ .33 Se .05 n 86		Good	.19	(16)	.36 (8)		- (2)				
		Fair	.34	(41)	.31 (20)	-.01 (5)	- (3)		- (3)	.45 (8)	- (2)
		Poor	.38	(29)	.29 (14)	- (2)		- (2)	- (1)	- (3)	
12-24 months $\overline{ES}$ .31 Se .05 n 62		Good	.33	(22)	.29 (7)					.35 (13)	- (2)
		Fair	.30	(24)	.31 (16)		- (1)		- (1)	.22 (6)	
		Poor	.31	(16)	.49 (6)		.23 (9)			- (1)	
			$\overline{ES}$	(n)							
24-36 months $\overline{ES}$ .28 Se .07 n 24	Quality of Study	Good	.27	(15)	.33 (9)		- (2)			- (4)	
		Fair	.47	(3)						- (3)	
		Poor	.21	(6)	- (1)					.08 (5)	
36-60 months $\overline{ES}$ -.02 Se .09 n 38		Good	-.01	(13)	.43 (5)		- (3)			-.39 (5)	
		Fair	-.03	(22)	.02 (12)					-.09 (7)	- (3)
		Poor	-.05	(3)						- (3)	
60+ months $\overline{ES}$ -.03 Se .07 n 49		Good									
		Fair	.17	(9)	- (1)		- (4)			- (2)	- (2)
		Poor	-.07	(40)	-.39 (18)		- (2)	- (2)		.05 (18)	

"-" means less than 5 ES's present in cell.

"Blank" means no ES's present in cell.

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these results are tentative, they provide valuable information about the current state of the art in early intervention.

Overall effects of early intervention. The overall conclusion is that early intervention programs do result in moderately large immediate benefits for handicapped and disadvantaged populations. These results are evident over a wide variety of outcome variables including IQ, motor, language, and academic achievement. Unfortunately, there are relatively few results for outcomes such as self-concept, social competency, or family and peer relationships. In addition, most of the effect sizes for the handicapped population refer to mentally retarded, orthopedically impaired, or heterogeneous groupings of handicapped children; and most of the mentally retarded populations are in the mild to moderate range. Very few effect sizes have yet to be included for severely or profoundly handicapped populations, sensory impaired children, behaviorally disordered children, or speech impaired children. Nonetheless, the data do support the immediate benefits of early intervention programs across a wide variety of children, conditions, and types of program.

Degree of structure. As shown earlier in Table 2.11, one of the most consistent findings in the data are that more highly structured programs are directly associated with more effective outcomes on the order of .3 to .5 standard deviation units. This information is supported by the fact that home intervention programs which use written programs are somewhat better than programs without written programs and that within-study comparisons between structured and unstructured programs show approximately half a standard deviation difference. This finding is in agreement with much of what has been reported in previous literature.

Involvement of parents. Results from the meta-analysis as to whether involving parents in intervention programs lead to more effective outcomes is less clear-cut. Contrary to what many previous reviewers have concluded, there is no clear evidence that parental involvement is a key to effective early intervention programs. Data from this meta-analysis do suggest that parents can be effective intervenors; however, it does not appear that parents are essential to intervention success, nor are interventions which use parents any more effective than those which do not.

Data for this conclusion are based largely on the results of studies with disadvantaged children. Considering only the data from studies with disadvantaged children, there is essentially no difference between programs which were delivered to the child only as opposed to those delivered to the child and the parent, no difference on the two variables which assessed the degree to which parents were involved in the program, and about a tenth of a standard deviation difference favoring center-based programs over home-based programs when analyses were limited to good studies on the same measures. Within-study comparisons of degree of parental involvement showed .08 of a standard deviation difference favoring more parental involvement. Many of these results, however, are due to one study (Gordon, 1968). When the Gordon study is excluded, programs which do not involve parents or involve parents less show an advantage of .06 of a standard deviation over increased parental involvement. Taken together, these data question the assumption that parental involvement is a key variable in providing effective intervention programs for disadvantaged children.

With handicapped children, the evidence is even less clear-cut because not as much data are available. In the initial analyses, programs which have extensive or moderate parent involvement have lower average effect sizes than programs with no parent involvement. This may be attributable in part to the fact that programs working with more severely handicapped children make greater efforts to involve the parents. In addition, these initial differences decrease substantially or disappear totally when the comparisons are limited to only high quality studies. Again, these data suggest that although parents can be effectively involved in intervention programs for their children, the involvement of parents is not an essential ingredient nor is there any evidence that programs which do involve parents are any more successful than programs which do not.

No within-study comparisons for parental involvement were identified in studies of handicapped children. In addition, the types of handicapping conditions with which parents might be most effective (behavioral disorders, speech impairments) are almost nonexistent in the data set at this point. This suggests that the relation between parental involvement and intervention effectiveness in programs for the handicapped is a fruitful area for further research.

Another problem with both the disadvantaged and handicapped subgroups in interpreting the degree to which parents should be involved in early intervention programs is that it is quite possible that what parents have to offer most in such programs is what has been measured least. In other words, parents may not be any more effective than anyone else in developing IQ, language, or motor skills, but may be very important in the transmission of cultural and moral values, the development of self-concept and social competency, and the establishment of aspirations and goals. These variables have been measured very seldom in the early intervention research literature.

Training of primary intervenor. It appears that primary intervenors who are certified are substantially more effective than noncertified intervenors for both handicapped and disadvantaged populations. These differences become even greater for handicapped populations when the analyses are limited to high quality studies or to similar types of outcome measures. The advantage for certified primary intervenors is even more impressive when one considers that certified intervenors are probably most often the primary intervenor with the more severely handicapped populations.

With the disadvantaged data set, the initial advantage for certified primary intervenors largely disappears when only good studies are considered. However, when only good studies with similar outcomes (i.e., IQ) are considered, there is almost a third of a standard deviation difference favoring certified intervenors over not certified intervenors. That these differences are based on reasonably large numbers of effect sizes (50 and 44 respectively) lends additional credence to the conclusion that certified intervenors are more effective than noncertified intervenors.

The data from the handicapped and disadvantaged populations reinforce the notion that training of intervenors is an important variable contributing to the effectiveness of early intervention programs. Unfortunately, no within-study comparisons have been identified at this point; thus identifying another fruitful area for further research.

Age at which intervention begins. Data included thus far in the meta-analysis provide little or no support for the popularly held notion of "the earlier the better". When data from only the disadvantaged population are considered, there is no indication of a linear trend with children who begin intervention earlier doing substantially better. When the data are limited to only good studies, or to good studies measuring only IQ, the results are the same. Looking at within-study comparisons, Gordon found a small positive effect of approximately a tenth of a standard deviation favoring those children who began intervention at earlier ages. Forty-two effect sizes from six other studies similarly found an advantage of about .07 of a standard deviation favoring those children who begin earlier. A tentative conclusion is that although there is a trend for children who begin earlier to do better, the differences are very small and unconvincing.

When only those studies are considered which included handicapped children, the results are less clear-cut. There is some evidence that children who start later do substantially better (see Table 2.14, Panel A). However, these results are very likely confounded because more severely handicapped children are probably identified and begin programs earlier but have a less positive prognosis. Furthermore, the handicapped data set does not include data for many types of handicapping conditions and the number of effect sizes in each group is relatively small. However, there are no data yet showing that the earlier programs start, the better children do. Again, more research focusing on within-study comparisons of time at which intervention starts is needed.

Maintenance of benefits. At first glance, the data in Table 2.15 suggest that for disadvantaged populations, the immediate benefits of early intervention decline rapidly up to about 36 months after the intervention is completed, and are completely washed out after that point. These data are more convincing because they are based on fairly large numbers of effect size. When data from only the good studies are considered, the trend holds up but is based on many fewer effect sizes. If one looks at only the results of IQ measures for good studies, benefits of early intervention do not wash out completely, but the number of effect sizes is so small that it would be unwise to place too much confidence in these results.

Do these results demonstrate that early intervention has no long-term effect? Such a conclusion would be unwarranted at this point because of the small number of effect sizes and the fact that many of the areas in which long-term benefits would be most likely have been very infrequently measured. However, the assertion that early intervention has no long-term effect is just as adequately supported (perhaps more so) than the frequent assertions that long-term benefits for early intervention have been demonstrated beyond a shadow of a doubt. The data included in the meta-analysis contain little, if any, evidence that long-term effects do exist. Therefore, it is important that both practitioners and researchers exercise caution in making claims about the long-term benefits of early intervention, and that more research on long-term efficacy is conducted.

Conclusions

Data collected and analyzed thus far in the meta-analysis provide a rich source of information for drawing conclusions about the effectiveness of early intervention, including the identification of which factors appear to contribute to the most effective intervention programs, and in identifying further research needs. At this point, the meta-analysis data suggest that early intervention practitioners and researchers should be much more cautious about asserting that intervention programs should be started as early as possible, should involve parents as much as possible, and result in long-term benefits. There does seem to be substantial support for the immediate benefits of early intervention and the fact that more highly structured programs are more effective than programs which are not so structured.

Data included thus far in the meta-analysis underscore the problem noted in the analysis of previous reviews of the early intervention literature, that many reviewers based their arguments more on emotion than on data.

There was a tendency to advocate for the necessity of early intervention programs rather than investigate what could be concluded from existing data. In other words, many people went out to find results that demonstrated the efficacy of early intervention rather than to find if early intervention was effective. To the degree that this is true, at least two negative consequences resulted. First, by "overpromising" what early intervention was able to deliver, the field may soon find itself in the position of not being able to deliver on promises which are impossible to meet. In a time of fiscal austerity, such a situation could boomerang on the advocacy efforts which were undertaken so strenuously in the 1970s and early 1980s.

Of more long-term consequence, however, is the fact that by being so anxious to prove that early intervention was effective, the field may have inhibited the conduct of research which is necessary to determine whether or not it is effective; and, if so, what types of programs are most effective. Thus far, the results of this meta-analysis have demonstrated that some of the most strongly held opinions about early intervention are in fact supported by very little data. For example, only nine studies were identified which compare different degrees of parental involvement, the overall results do not support the advantage of parental involvement, and none of these studies were done with handicapped children. Yet, the notion that parental involvement is essential for success in early intervention programs for handicapped children is pervasive. Additionally, only seven studies were identified which compared the effects of beginning intervention programs at different ages, and these studies provided very little support for the notion that programs which start earlier are more effective. Nonetheless, everyone seems to "know" that programs which start earlier are more effective. The "knowledge" of facts such as those cited above has been disseminated broadly and used extensively in advocacy efforts and may, in fact, have inhibited the types of research that are most important to conduct. In other words, researchers did not propose and agencies did not fund studies to investigate the immediate and long-term effects of variables such as degree of parental involvement, or age at which intervention begins, because it was assumed these questions had already been completely resolved.

Although a number of tentative conclusions are supported by the data thus far collected, in most instances, the results of this meta-analysis do not provide definitive evidence for or against the efficacy of early intervention or various types of intervention. Important findings from the data are to identify areas where more research is needed. By pointing out exactly what kind of evidence is available for answering various pressing questions on the efficacy of early intervention, it is hoped that other researchers will use this to plan and conduct additional research. In addition, the number of analyses which are possible with this data set are voluminous. It is hoped that researchers will utilize the data made available in this meta-analysis to examine alternative hypotheses and potentially confounding variables for the tentative conclusions which have been presented. Finally, it is hoped that one of the strongest results of this meta-analysis will be that practitioners, researchers, and administrators will be more cautious in declaring what is "known" to be effective in the area of early intervention, so that future research will be encouraged.

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CHAPTER III

COST-EFFECTIVENESS ANALYSIS OF EARLY INTERVENTION PROGRAMS

In the September, 1982 proposal, the Early Intervention Research Institute proposed two major goals in the area of cost-effectiveness (CE) analysis of early intervention:

1. To develop a model for using cost-effectiveness analysis techniques with early intervention programs.
2. To apply the cost-effectiveness model in the comparison of early intervention programs.

The procedures used to create and use the model will be described below in two sections: The Cost-Effectiveness Protocol and A Cost-Effectiveness Study Comparing Half- and Full-Day Early Intervention Programs.

The Cost-Effectiveness Protocol

The production of the cost-effectiveness protocol by EIRI follows the steps typically used in model development and Research and Development:

1. Review the state of the art.
2. Plan scope and content.
3. Develop preliminary form.
4. Conduct preliminary field test.
5. Revise product.
6. Conduct main field test.
7. Receive expert review and revision.
8. Conduct operational field test.
9. Revise final product.
10. Disseminate and distribute.

To date, EIRI has completed the first six steps, through the main field test, for collecting, analyzing, and summarizing cost data. The details of steps 1-5 are provided below and step 6 is described in the second section of this chapter as A Cost-Effectiveness Study of Half- Versus Full-Day Programs. During the next funding cycle (October 1, 1983 through September 30, 1984), EIRI will concentrate on collecting and analyzing effectiveness data and will solicit expert feedback, conduct the operational field test, and produce a cost-effectiveness manual for distribution.

Specific procedures used to complete the first five steps with cost data are detailed below.

1. Review the State of the Art

A computer search was conducted to locate research on cost-effectiveness in early intervention. Although the literature was replete with statements describing programs as "cost-effective" for early intervention, no study was found to report results of a cost-effectiveness analysis actually conducted. Similarly, research from related areas (health and social services) showed few actual cost-effectiveness comparisons.

With few models or samples to lead the way, EIRI generally formulated techniques for conducting cost-effectiveness from theoretical discussions of what should be undertaken. Specific cost-analysis procedures were adopted from cost-accounting and the economic literature on social welfare. Specific procedures for determining a comprehensive measure of program effectiveness were not developed this past year because the outcome measures available to EIRI were dependent on what field test sites chose to use. EIRI expects to investigate the area of program effectiveness in detail in future years and develop the effectiveness protocol simultaneously.

The ingredients approach developed by Henry Levin (an Advisory Committee member) was chosen as the preferred method to identify and collect cost data. Under the ingredients method, all resources used by the program are identified. These resources include services and materials purchased by the programs being analyzed as well as services and materials used without direct purchase (e.g., parent intervention time, federally supported lunch, volunteer aide time). A preliminary list of ingredients was drafted from the literature and used as an outline in preparing the cost analysis section of the protocol.

Five guidelines for cost-effectiveness analysis were established following a review of economic principles and were incorporated throughout the cost analysis sections of the protocol.

1. Cost-effectiveness analysis is a comparative procedure that shows the relationship of costs to effectiveness across two or more alternative choices. A program cannot be deemed "cost-effective" through analysis but can be shown in relative terms to be more or less cost-effective than another program.
2. Cost-effectiveness analysis is a tool for decision makers who desire information to assist them in making educated choices. The analytical process of collecting, analyzing, and summarizing data is time consuming and expensive. Consequently, the analysis should be reserved for those situations where real choices are to be made and resulting data will have a bearing on final decisions. The findings from a cost-effectiveness analysis should not be viewed as the final step with a path of action clearly marked, but as one set of extremely useful data to use in conjunction with other data sets to provide the best system for serving children given a unique set of circumstances.

3. The questions to be answered by decision makers regarding the best program should structure the format of the cost-effectiveness analysis. Careful and considerate attention must be given to the formulating of the question to be answered. The question must reflect true alternative choices that are reasonable and plausible. If a choice between alternatives involves comparing the use of professional versus paraprofessional speech therapy aides, then both alternatives must be feasible. Because the choice involves an examination of only one component of the program, the analysis need only be concerned with costs and effectiveness directly related to speech therapy.
4. All resources associated with program aspects under consideration must be identified and valued as a private or social cost. To exclude some resources, such as volunteer time, because they are not purchased directly, will misrepresent the resources needed to replicate the program. Without the volunteers, for example, the program would be different--possibly, the outcome would be different. So while listing program requirements, resources for all components must be identified and valued in dollars.
5. The measure of effectiveness must be comprehensive and provide an estimation of program impact on those facets of life which society (consumers) believe important. To compare costs and effectiveness, it is crucial that both sides be as complete as possible in representing what the program did. A CE ratio showing total costs by only IQ gain would inflate the price of the program and misrepresent the effect. Unfortunately, we as a society have not determined what we value as the benefits of early intervention and

until we do, the comprehensive measurement of program effectiveness is impossible. EIRI is committed to striving for research in this area as cost-effectiveness procedures become more refined.

2. Plan Scope and Content

The Cost-effectiveness Protocol was organized into four sections: Description of Cost-Effectiveness Analysis, Cost Analysis, Effectiveness Analysis, and Cost-Effectiveness Summary. For the first year, EIRI focused on the development of the cost analysis section of the protocol and this section is included in a separate document titled "Cost-Analysis". Cost analysis is further divided into three subsections labeled "Cost Data Collection", "Cost Data Analysis", and "Cost Data Summary". The "Cost Data Collection" subsection has been included in this report in Appendix 3-F.

Cost data to be collected were organized into three categories: personnel, nonpersonnel (facilities, equipment, transportation) and contributed resources (parent, government, volunteer, donations). The procedures for collecting and analyzing data were developed based on using the child as the unit of analysis. That is, all cost data were disaggregated by the children using the service being valued. Decisions on how to disaggregate costs across children were made based on accepted accounting procedures. Some costs were prorated based on percent of time used and others were divided across the board because time use was not available (e.g., administrator's time).

3. Develop Preliminary Form

Cost data collection forms were developed to be used on site to collect descriptions of each program component. These forms are located in Appendix 3-F. Typically, cost data were collected on site and included an extensive program description plus child and staff demographics and specifics regarding the resources required for the operation of each component of the project. For ease in data collecting at the site, data were organized in nine categories: Personnel Expenses, Personnel Time, Child Demographics, Child Transportation, Facilities, Equipment, Supplies, Travel, and Contributions.

The major considerations in form development were that the forms had to prompt the data collectors as to what to collect and had to organize data in a manner that would lead to data analysis. For example, to accurately describe the program, demographic data on children and staff were needed, so a form was developed with spaces for filling all relevant bits of information. To value the transportation costs for each child, specific information was required about the vehicle, gas, insurance, number of children other than preschool who used the vehicle, and miles per day.

Cost data analysis forms were developed to reorganize the data from the collection phase. During data analysis, cost data were disaggregated across each child in the program. Each cost was handled separately and, depending on the program, could result in a breakdown of dollars, time, or counts of more than 50 variables. By dividing costs using the child as the unit of analysis, a record of costs for specific individual costs could be obtained. For example, the cost of classroom space and therapy room space for child ID #11042 could be identified. Although several sets of forms were produced by EIRI to assist in disaggregating costs, the system tends to vary substantially across programs and a final, generic protocol has not been finalized at this time.

The next stage in cost data protocol development is to summarize the cost data into a meaningful format that answers questions which originally stimulated the research, that examines sources of covariation among variables to explain relationships, and that can be displayed with effectiveness data to provide an estimation of overall net worth. Because all data are analyzed at the individual child level, final summaries can be provided by aggregated data by several subgroupings. For instance, the average total costs for speech impaired children can be identified. Costs for facilities can be shown for home-based and center-based children. Travel costs for therapists and average number of therapy hours per child can be shown for rural and urban programs. Essentially, cost data summaries are limited only by the questions that decision makers chose to ask.

4. Conduct Preliminary Field Test

Two sites in Wyoming were selected for the preliminary field test of the cost data protocol. The comparison of alternatives was not possible at the two sites because of research design problems (random or matched sampling not available) and because of the lack of feasible alternatives of choice. Therefore, effectiveness data were not collected, nor were cost-effectiveness ratios computed and compared. The major objective of the preliminary field test was to determine if cost data could be collected, analyzed, and summarized using procedures established in steps 1-3.

5. Revise Product

The preliminary field test proved successful and cost data were easily handled within procedures developed. Basically, revisions in forms were made to expedite the collection of data on site and to more easily handle the disaggregation during analysis.

6. Conduct Main Field Test

This test was conducted in Sioux City, Iowa, where a research question had been formulated, "What is the relative cost effectiveness of half- versus full-day intervention?" This question permitted both costs and effectiveness data to be analyzed and compared and the findings are explained in detail in the next section.

A Cost Effectiveness Analysis Comparing Half- and Full-Day Intervention Programs

Although hundreds of studies have been conducted on various aspects o early intervention for preschool children, there is much disagreement as t the relative worth of various types of early intervention services. An ac rate determination of the relative worth of programs requires that both th effectiveness (or outcomes) and costs of alternatives be analyzed simultaneously. For example, the most effective program may be prohibitively expensive and, as a result, may not be the most cost effective. Conversel an ineffective program which is relatively inexpensive also is not cost effective. As the availability of money for educational programs becomes more restricted, administrators, providers, and consumers are becoming mo concerned about which of various program alternatives are the most cost effective. Such decisions require that comparative cost and outcome data analyzed simultaneously.

Appropriately conducted, a "cost-effectiveness" (CE) analysis requir the comparison of alternatives. To conclude that a single project or approach is "cost effective" ignores the critical question of ". . . as c pared to what?" A recently conducted review of literature which claimed investigate the "cost effectiveness" of early intervention programs show that most studies suffered from inappropriate or incomplete analyses of the costs and the effects. The most frequently identified problems included:

1. Important cost data (e.g., contributed and shared resources) we omitted from analyses; resource expenditures were derived using only bud figures.

2. The cost differentials of serving subgroups of children (e.g., orthopedically versus mentally disabled, rural versus urban) were ignore

3. Costs and effectiveness were never examined simultaneously within the same study.

The methodological inadequacies of previous efforts to examine the cost effectiveness of early intervention program alternatives have left decision makers with very little empirical evidence on which to base decisions. A common concern facing preschool service administrators is how to reduce or hold down costs while maintaining or increasing the level of benefits.

One technique which some have suggested to reduce costs is the use of half-day programs rather than full-day programs. However, to examine only the costs and not the benefits of programs will provide only half of the information needed for decision making. The first question to answer in comparing half-and full-day programs should be, "Are half-day programs as cost effective as full-day programs?" In other words, if half-day programs cost 30% less but result in only one-half as much gain, it would be foolish from a "cost-effectiveness" perspective to switch to half-day programs. An alternative which is truly more cost effective would result in the same or greater gain for less money--i.e., more gain per dollar spent. The second and even more intriguing question is, "Are half-day programs more cost effective with some types of children and full-day programs more cost effective with others?"

The study described below analyzed the costs and effectiveness of half- versus full-day programs for children with communication and mental handicaps. To avoid the deficiencies found in previous cost analyses of early intervention programs, a cost-effectiveness model was developed within an economic framework. The accuracy of the model depends on the collection of a comprehensive data base describing the costs and procedures of all program components. Program budgets cannot be used as the only source of data because budgets usually do not accurately reflect the total costs of a program. For instance, the value of contributed resources (e.g., regional services, equipment) are not typically listed as expenses even though they represent expended resources. To overcome the problems with using only budget figures in cost-effectiveness (CE) analysis, this study has defined and measured all of the costs (resources) needed to implement each of the two delivery strategies.

An important characteristic of this cost-effectiveness model is that because cost data are partitioned separately for each child, costs can be analyzed using a variety of breakdowns. Most of what is described in this report partitioned costs and effectiveness data separately for communicatively disabled (CD) and mentally disabled (MD) children. Other subgroupings (e.g., age at entry, mildly handicapped versus moderately handicapped, duration of treatment) could be analyzed easily because all data were collected using the child as the unit of analysis.

Objectives

The purpose of this study was to conduct a cost-effectiveness analysis of using half- and full-day programs to provide services to preschool handicapped children. Specific objectives were:

1. To determine the cost and effectiveness differentials of using half- and full-day programs.

2. To determine the cost and effectiveness differentials of serving communicatively and mentally disabled children.

Methods

This study was conducted in cooperation with school districts in Area Education Agency #12, Sioux City, Iowa. Seven half-day classrooms were located in the Sioux City school district, and eight classrooms using the full-day program were located in school districts surrounding Sioux City. Provided below is a detailed description of the research sample, school program, research design, dependent variables, and data collection.

Research Sample

To compare full- and half-day programs, a matched sample was selected for both communicatively disabled (CD; N = 11 pairs) and mentally disabled (MD; N = 15 pairs) children in the classrooms referred to above. The number of males in the sample were 5 (CD, half), 7 (CD, full), 9 (MD, half), and 10 (MD, full). Children in half- and full-day programs were matched based on months of previous treatment in home- and center-based programs, age, and developmental months from the Minnesota Child Development Inventory (MCDI) at the time they entered treatment (see Table 3.1 for mean scores).

The MCDI was developed in 1972 as an instrument for identifying children from 6 to 78 months who are developmentally delayed. To administer the instrument, an interviewer asks the child's mother to report which of 320 behaviors she has observed the child exhibited. Scores are reported for each of the eight developmental areas listed in Table 3.1. The mean internal consistency of the MCDI scales was established at .79 using the split-half method. Using mental ages derived from the administration of the Stanford-Binet, Bayley, and Cattell tests, a correlation of .92 with the MCDI General Developmental Scale was found. While attempts at establishing validity have

Table 3.1

Mean Scores on Matching Variables
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Age	57.6 (9.0)	54.5 (8.9)	60.8 (7.8)	62.6 (9.5)
Months in home program	.5 (1.8)	1.1 (2.5)	1.7 (3.8)	.93 (2.7)
Months in center program	12.8 (6.3)	13.5 (6.2)	14.8 (6.7)	14.5 (7.8)
Chronological months at testing data	37.2 (7.0)	34.0 (11.6)	36.5 (5.5)	37.8 (8.7)
MCDI scores (developmental months)				
General development	21.9 (7.3)	21.5 (8.0)	20.6 (4.3)	22.2 (6.6)
Gross motor	26.4 (8.4)	26.5 (13.0)	28.6 (12.2)	28.3 (12.6)
Fine motor	29.3 (9.6)	27.4 (12.5)	23.3 (5.2)	25.6 (8.4)
Expressive language	19.2 (7.3)	18.5 (6.6)	19.4 (4.4)	20.3 (5.6)
Comprehension/conceptual	20.8 (6.5)	21.2 (7.4)	20.1 (3.9)	21.8 (5.8)
Situation comprehension	28.2 (10.1)	28.1 (12.8)	26.1 (8.2)	27.1 (10.0)
Self-help	31.0 (9.3	31.1 (14.0)	30.2 (8.9)	31.8 (11.4)
Personal/social	28.1 (12.6)	23.7 (8.2)	22.1 (7.0)	27.6 (9.8)

been undertaken, adequate work has not been completed. Although there may be some problems in using the MCDI to distinguish between delayed and nondelayed low SES children, research has shown that 69% to 86% of children tested were correctly classified using teacher's observation as a standard.

Individual child data on each matching variable are presented in Appendix 3-A. There were no statistically significant differences between half- and full-day children on any of the matching variables.

School Program for Half- and Full-Day Classrooms

Information describing the half- and full-day programs is presented in Table 3.2. Details are explained in the sections below.

Table 3.2

Descriptive Means for Half- and Full-Day Classrooms

Variable	Half	Full
Length of children's school day (hours)	3.25	6.5
Children per class	6.68	7.28
Hours per child per year		
- Speech therapy	19.04	14.60
- Physical/occupational therapy	8.40	6.36
- AEA consultant	7.46	6.68
- Parent involvement	76.28	98.49
- Music, art, PE		
Children per adult	3.34	3.64
Miles - home to center	5.39	6.62
Number of aides per class	1.00	1.10
Number of volunteers per class	0	.43
Salary + Benefits		
- Teacher	18,703.00	16,844.00
- Aide	5,601.00	5,514.00
Cost of contact hour/ Hour of instruction	3.04	2.04
Classroom sq. feet	750	625
Value of classroom	4,598.00	4045.00
Teacher		
- years experience	6.9	4.9
- Degree	4-MA, 1-BS	1-MA, 6-BS
Budget cost per hour of instruction		
- Personnel cost/hour of instruction	8.65	4.90
- Nonpersonnel cost/hour of instruction	1.83	.98

Half-day program. Teachers in the half-day programs taught two classes a day, one in the morning and one in the afternoon. A typical half-day consisted of approximately three and one-half hours in which children were taught developmental skills in individual and group sessions. Children received therapy during class time in separate rooms. Once a week, children received approximately 15 minutes each of art, music, and PE. Most of the teachers visited the home of each child two to four times a month to talk to the parents about their children's progress and suggest developmental activities for the child the parents could conduct in the home.

Full-day programs. All teachers in the full-day program taught the entire day (approximately 7 3/4 hours). The curriculum was similar to the one used in half-day programs, except that art, music, and PE were not provided by teachers outside the classroom. Children received therapy either in their classrooms or in another room. Teachers typically visited the home three to four times a month to work with the parents. Most children lived in the same school district where they attended class, but a few were bused from other districts.

Research Design

Both effectiveness and cost data were analyzed using a 2 X 2 comparison for CD and MD children across half- and full-day programs:

Table 3.3

Research Design

	CD	MD
Half	N = 11	N = 15
Full	N = 11	N = 15

Dependent Variables

Effectiveness. To measure the effectiveness of the full- and half-day programs, scores from the Early Childhood Continuum of Assessment, Programming, Evaluation, and Resources (CAPER) were analyzed. The CAPER is a locally developed developmental inventory designed specifically for use with preschool handicapped children. A continuum of 1,102 objectives can be tested on children aged 0-72 months, in each of five strands: motor, language, social, self-help, cognitive. Correlations computed between the CAPER and the Stanford-Binet were .91 on cognitive and between Preschool Language Scale and CAPER were .86 on expressive language.

Since some CAPER subtest scores were not collected for all children, only those subtests with the most complete data were used in the analyses: expressive language and cognitive subtests. Outcome data were analyzed using the score derived by computing $\frac{\text{Developmental Age}}{\text{Chronological Age}}$ for each child.

Costs. Three categories of cost data were collected: *Personnel costs* (salary and benefits), *Nonpersonnel costs* (equipment, facilities, and transportation), and *Contributed resources* (parent time and materials, consultants, and volunteer time). Cost data for one year were disaggregated across all children enrolled in half- and full-day programs (see Data Collection). Then costs associated with only those children in the research sample were used in the analysis.

Data Collection

Outcome data were collected by the classroom teacher, who administered the CAPER in May or June, 1983. The CAPER was administered to all children in each class. The cognitive subtest was given to all children, then other subtests were administered to only those children with perceived deficiencies in the areas covered by the subtest.

In general, *cost data* were collected from three sources. First, all teachers were interviewed individually and asked to describe their schedule for a typical week. The week's schedule contained information by 15-minute intervals on teacher activity and individual child activities. Similar schedules were prepared for therapists and aides.

Second, school district staff were interviewed by phone or in person to obtain costs for personnel, equipment, facilities, and transportation. Third, school records were reviewed to collect demographic information. Appendix 3-D contains a detailed description of the data collection process.

Cost data were collected and categorized in the following format: (a) child descriptive information, (b) costs of personnel time for direct contact with children, (c) noncontact personnel costs, (d) nonpersonnel, and (e) costs of contributed goods and services. The compilation of these data for analysis involved both the reporting of information as it was received (e.g., descriptive information) and the disaggregation of time and costs, on a per child basis, from the information collected. The following will be an account of the procedures involved in ascertaining these amounts.

Descriptive information. The following information was collected directly from the AEA records of each child: (a) age, (b) gender, (c) handicap, (d) months spent in home-based program, (e) months spent in center-based program, and (f) type of preschool program (half-day or full-day). From the information provided by each preschool teacher, other identification data were collected: (a) hours per week spent in the center, (b) distance traveled by each child to and from the center, (c) type of therapy (speech, physical, and/or occupational) in which the child was involved, (d) number of hours of in-home instruction the teachers provided, (e) an estimate of parent involvement in prescribed therapeutic intervention, and (f) the mode of transportation utilized by the child in traveling to and from the preschool. This information was received and entered directly as identifying data for each child.

Direct contact. All costs for direct contact were computed as a proportion of salaries. Salaries shall be defined in this report as wages plus benefits. Direct contact costs were always applied specifically from a particular service provider to the child receiving the contact. Personnel supplying direct contact time were classroom teachers, aides, therapists, bus drivers, cafeteria personnel, and other teachers for recess, music, art, and PE. Direct contact time is defined as hours spent in contact with the children for instruction, therapy, recess, lunch, nap, or riding a bus. Each person who directly contacted a child was asked to compile a typical weekly schedule that indicated the activity, time period, and children involved. Each shared time block was divided by those children in the group receiving service. For example, each child in a group of three for 15 minutes, received 5 minutes of instruction but used only 5 minutes of the teachers salary. In this manner, the teacher's salary was then prorated among the children based on proportion of time used by the child.

Personnel involved include all that provided direct contact, principals, secretaries, AEA personnel, custodians, and consultants.

Noncontact personnel costs. All personnel associated with preschool handicapped reported on their time spent in activities other than direct contact. Data were collected for a typical week, as with contact time, then applied throughout the year as appropriate. Activities conducted outside the regular schedule were also reported and a proportion of salary was allocated based on time spent. Personnel were asked to report their time in the following categories.

Preparation refers to activities that support "Direct Intervention", for example, preparation of materials, working up lesson plans, organizing room, preparing food, daily record keeping, daily clean-up, and writing child specific reports. Also included are "staffings" (meetings with several staff for the purpose of planning curriculum for a specific child). Costs for preparation time were computed by individual child using the same proportions calculated for direct contact and applying that proportion to the salary costs.

Travel refers to travel for home visits and for center-related activities that occur on a weekly basis and pertain to particular children. Travel from home to work is not included. All travel time costs are assigned directly to the child for which travel is undertaken. When several children are to benefit from travel, costs are divided among them.

Parent contact refers to regularly scheduled parent training and IEP meetings, excluding visits in conjunction with home program, also short unscheduled meetings which occur frequently throughout the year. Salary costs for parent contact time were always assigned directly to the individual child.

CAPER refers to the salary costs associated with testing children with the CAPER. The test was given to all children every nine weeks during the school year.

Consultant refers to the salary costs of providing technical assistance to classroom teachers and aides. Salaries were divided first among classrooms based on the proportion of time spent by the consultant in the classroom. Then classroom consultant costs were divided evenly among all children enrolled in the room.

Special Education administration refers to costs for administrative time needed to run the half-day program. Because all half-day classrooms are located in one building, a half-time supervisor and full-time secretary are used in addition to the K-12 principal found in both the half- and full-day programs. Salaries for special education administration were divided equally across all half-day students.

Principal/secretary - administration - salary costs for the building principal and secretary were divided across all children enrolled at the facility (preschool through grade 12).

AEA - administration - Iowa has divided the administration of its school system into 15 Area Educational Agencies (AEA). The AEA preschool handicapped program then services the school districts in its area. Data were collected that described the administration time devoted by the preschool supervisor, PT/OT supervisor, and speech supervisor to the preschool program. The salary cost for this time was divided evenly among all children in both half- and full-day programs.

Other - personnel engaged in several other activities during the year, where the salary cost for time was applied to children in the program. Costs for screening, evaluation, inservice, and custodial were applied across all children who were served by the personnel generating the costs.

Contributions. This category involved the collection and computation of cost per child data of resources necessary in providing preschool intervention. Specifically, this includes the cost of the home space used in the delivery of home intervention by staff and parent, cost of transporting child to and from center by the parent (for both time and vehicle operation, 23¢/mile), the cost of contributed time by parents and student aide volunteers in implementing prescribed program intervention, and the cost of food for lunch and snacks provided either by the parent or federal government subsidy.

The cost of home space was calculated from the number of hours the home was used for intervention and the square feet of space used, and the cost per square foot. Square foot costs were determined by estimations made by local real estate agents when asked to provide a rental value.

The cost of parent and volunteer time was computed at $4.97 per hour. This represents the wages plus benefits needed to hire a paraprofessional to do the same job.

Nonpersonnel. Nonpersonnel costs include transportation, equipment, and facilities.

Transportation included the costs for transporting children and for reimbursing automobile expenses for consultants, therapists who traveled to schools, and teachers who traveled to homes. Travel reimbursement for therapists, consultants, and teachers was based upon $.23/mi. The cost of operating the school bus per mile was determined by contacting a local bus company contracted for those services ($.06/mi/child). The number of round trip miles for each child was multiplied by that cost for each of the children.

An inventory of classroom equipment and costs for each classroom was provided by either the teacher or principal/administrator. Where the cost was not provided, the depreciated value of classroom equipment was ascertained by contacting local merchants of that equipment. Salvage value was used for items that were depreciated completely. The cost for individual items in each classroom was then totalled and distributed evenly over the number of children using the classroom.

Cost of each facility was either provided by the administrator (cost to rent/year) or determined by contacting local real estate appraisers who could provide an estimate of yearly rental cost for each facility. Information regarding the proportion of the entire facility utilized by the particular class under study was provided by the individual teacher. That proportion of square footage was multiplied by the previously obtained cost/sq. ft. of the facility. That same proportion was utilized in determining cost of insurance and maintenance, figures which were provided by the administrator. The proportional cost of facility, insurance, and maintenance was totalled and that cost was divided evenly over each child in that particular classroom.

Results

The results of this study will be presented in three sections: Effectiveness, Costs, and Considering Costs and Effectiveness Together. (Appendix 3-E contains a complete accounting of each cost variable, including means and standard deviations, by half- and full-day breakdowns for CD and MD children.)

Effectiveness

To determine the effectiveness of the half- versus full-day programs, CAPER scores collected at the end of the 82-83 school year were analyzed. Individual test scores and the date of CAPER administration are reported in Appendix 3-B. Two CAPER subtests (expressive language and cognitive) were used to analyze the differences between half- and full-day programs. In analyzing the test results both children in each matched pair were eliminated from analysis if at least one child had missing data. The final analysis of expressive language was conducted on the scores from 11 matched pairs of CD and 11 matched pairs of MD children for the half- and full-day programs. For the cognitive scores, 10 CD pairs and 15 MD pairs were included in the analysis.

The mean and standard deviation for the two tests by handicap and by program are given in Table 3.4. The results show that overall, CD children made higher scores than MD children on both expressive language and cognitive subtests. An examination of data by half- and full-day shows that CD children in full-day programs scored higher on both subtests than CD children in half-day programs. However, MD children in half-day programs scored slightly higher on both subtests than MD children in full-day programs. There were no statistically significant differences between half- and full-day programs for either CD or MD children (CD expressive, t = 1.56; CD cognitive, t = .98; MD expressive, t = .15; MD cognitive, t = .51).

Table 3.4

Mean End of Year CAPER Scores
(Standard Deviation)

Subject	CD		MD	
	Half	Full	Half	Full
Expressive language	77.09 (13.72) N=11	87.91 (21.94) N=11	73.18 (19.27) N=11	71.91 (16.43) N=11
Cognitive	95.9 (7.31) N=10	99.20 (9.69) N=10	81.53 (13.21) N=15	78.33 (15.33) N=15

Table 3.5 shows the differences between half- and full-day programs in standard deviation (SD) units. Comparing the test results of all of the children in the full-day program with all of the children in the half-day program, there appears to be some, but not dramatic, benefit from the extra time provided by full-day programs, especially in expressive language test

scores (full-day scores are higher by .21 standard deviation units--this is comparable to an IQ gain of about 3 points). However, when the scores are examined separately for CD and MD children, the pattern is strikingly different. In expressive language, full-day CD children are .58 SD units above CD children in the half-day program and .39 SD units on the cognitive subtest. The results for MD children are just the opposite. Cognitive scores for MD children were lower in the full-day program (-.23 SD) than in the half-day program. If the analysis were to end at this point, it would seem that full-day programs are better for CD children, but half-day programs are better for MD children. However, less than half the story has been told. Much more will be learned by considering the cost data in conjunction with the effectiveness data.

Table 3.5

Differences in CAPER Scores in
Pooled Standard Deviation Units

Subtest	CD Full vs. half	MD Full vs. half	Overall Full vs. half
Expressive language	+.58	-.07	+.21
Cognitive	+.39	-.23	+.03

Costs

The costs for both half- and full-day programs are shown for CD and MD children in Table 3.6. In this table, as with all cost tables, data are presented by mean per child costs. Budgeted Costs have been subdivided by personnel and nonpersonnel. TOTAL is the sum of Budgeted Costs and

Contributions. (Appendix 3-C contains individual child data with the means and standard deviation for several computed variables.)

Intuitively, one would expect full-day programs to be more expensive than half-day programs, and the TOTAL shows this to be true for both CD and MD children. However, the cost differentials vary considerably by handicap; full-day TOTALS are only 12% higher than half-day for CD children but 31% higher for MD children.

The breakdowns of Budgeted Costs and Contributions in Table 3.6 provide some other interesting and unexpected comparisons. Budgeted Costs are defined as those expenses which are paid out of pocket and represent a real

Table 3.6

Mean Costs Per Child Per Year
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Personnel costs	6158.73 (729.98)	5959.36 (949.60)	5208.20 (856.06)	6855.40 (1283.38)
Nonpersonnel costs	1393.73 (262.23)	1408.09 (564.87)	1167.93 (96.25)	1446.07 (518.00)
Total Budgeted Costs	7552.45 (965.61)	7367.45 (1225.92)	6376.13 (920.08)	8034.47 (1476.11)
Contributions	380.27 (192.97)	1481.00 (2139.38)	376.00 (365.23)	781.87 (459.95)
TOTAL	7932.73 (839.95)	8848.45 (2478.10)	6752.13 (986.42)	8816.33 (1453.68)

flow of cash. Contributions represent the dollar value of services and items which have been donated (not paid for by program). Comparing Budgeted costs and Contributions for just CD children, one can see that Budgeted costs are slightly higher for half-day programs but contributions are considerably higher for full-day programs. For MD children, both Budgeted costs and Contribution are higher in full-day programs.

An examination of Personnel Costs shows that for CD children, full-day costs are 3% lower than half-day, in the opposite direction of expectations. Whereas full-day costs for MD children are more in line at 32% higher than half-day. Although nonpersonnel costs are in the expected direction, differentials for CD children (1% higher for full-day) are very slight and for MD children more reasonable (24% higher for full-day). The reasons for these differences are explored in detail below.

Results of analyses of variance conducted across half- and full-day programs are presented in Table 3.7. Intuitively, one would expect statistically significant differences to occur with highest costs associated with full-day programs. As expected, with MD children all differences are

Table 3.7

F Tables for Total Costs Across
Half- and Full-Day Programs

Variable	CD			MD		
	MS	F	p	MS	F	p
Personnel costs	218,602	.305	.587	14,287,140	12.006	.002
Nonpersonnel costs	1,134	.006	.940	580,186	4.180	.05
Budgeted costs	188,237	.150	.703	20,625,520	13.635	.001
Contributions	6,663,803	2.888	.105	1,235,458	7.163	.012
Total	4,612,060	1.347	.259	31,956,912	20.71	.000

statistically significant at the .05 level, with full-day programs having the highest costs. For CD children, however, no statistically significant differences were found.

Educational significance is typically demonstrated when programs differ by .5 standard deviation units. Table 3.8 shows that overall and for MD children most costs are educationally significantly different, reflecting the higher costs for the longer school day in full-day programs. For CD children, Budgeted cost differentials were not educationally significant, although half-day personnel costs came very close to being significantly higher (.24) than full-day. Full-day CD children did receive significantly more contributed resources than half-day.

Table 3.8

Differences in Costs Between Half- and Full-Day in Pooled Standard Deviation Units

Variable	CD Full vs. Half	MD Full vs. Half	Overall Full vs. Half
Personnel costs	-.24	+1.08	+.65
Nonpersonnel costs	+.03	+.71	+.41
Budgeted costs	-.17	+1.13	+.67
Contributions	+.69	+.89	+.75
Total	+.49	+1.28	+.92

Further breakdowns in the cost data are discussed in the sections below that examine Budgeted Costs and Contributions.

Table 3.9

Mean Personnel Costs Per Child Per Year
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Direct instruction	2015.8	2237.0	1702.4	2668.0
- Teacher	1042.91 (86.42)	1427.45 (691.59)	1090.13 (287.34)	1872.27 (792.25)
- Aide	436.64 (215.14)	493.82 (239.48)	322.33 (164.57)	504.33 (302.57)
- Speech	375.36 (184.60)	282.18 (138.43)	130.20 (172.91)	196.00 (196.37)
- PT/OT	101.18 (161.60)	26.91 (41.52)	89.07 (232.04)	86.07 (145.29)
- Music, art, PE	59.73 (23.47)	6.73 (22.31)	70.67 (8.07)	9.87 (26.04)
Preparation	379.09 (127.23)	500.27 (296.62)	581.33 (144.55)	601.20 (294.38)
Travel	410.27 (132.84)	618.09 (280.28)	247.13 (166.36)	779.20 (681.84)
Parent contact	95.00 (109.15)	84.64 (97.36)	-	114.40 (96.81)
CAPER	149.64 (48.48)	122.18 (97.02)	94.53 (32.15)	163.33 (90.56)
Inservice, Other	362.00 (114.17)	315.82 (213.15)	297.53 (133.14)	301.13 (257.10)
Consultant	84.00 (114.89)	59.18 (18.99)	49.47 (108.52)	66.07 (21.30)
Sp Ed - admin	284.55 (62.69)	-	230.00 (51.40)	-- --
Principal/sec - admin	359.00 (0)	284.18 (136.71)	359.00 (0)	298.47 (128.74)
AEA - admin	1655.00 (0)	1655.00 (0)	1655.00 (0)	1655.00 (0)
Total personnel costs	6158.73 (729.98)	5959.36 (949.60)	5208.20 (856.06)	6588.40 (1283.38)

35% more aide services. Full-day CD children received 24% less teacher services, 44% more speech services, 69% less PT/OT services than full-day MD children.

A comparison of costs for only CD children shows only $221 per child difference in direct instruction between half- and full-day (11% higher).

The largest contributors to the high cost of half-day programs for CD children is the fact that half-day CD children receive over twice as many hours of expensive specialist time (speech, physical, and occupational therapists) as do CD children in the full-day program. A breakdown of contact hours by intervenor is shown in Table 3.10

Table 3.10

Mean Contact Hours Per Child Per Year
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Teacher	58.82 (15.19)	137.64 (46.19)	69.33 (23.70)	146.87 (41.96)
Aide	50.45 (29.62)	125.36 (61.97)	51.47 (30.87)	113.87 (68.88)
Speech therapist	33.73 (11.85)	18.73 (8.45)	11.40 (12.95)	13.60 (13.31)
Physical and occupational therapist	9.73 (14.70)	1.55 (2.34)	8.2 (15.94)	4.73 (8.58)
Music, art, PE teacher	4.45 (.82)	.64 (2.11)	4.73 (.80)	.93 (2.46)
Total contact hours	157.18 (43.88)	283.91 (78.63)	145.14 (45.55)	280.00 (75.84)

Although CD teacher and aide contact hours are higher in the full-day program, this expense is not enough to offset the high salaries paid for professional therapists. As indicated in Table 3.10, the therapy hours

Budgeted costs. Surprisingly, when only CD children are considered (Table 3.6), the full-day program is slightly less expensive than the half-day program ($199 per child or 3%). Although, when CD and MD children are considered as a group, the full-day program costs 15% more than the half-day program ($866 per child), and when only the MD students are considered, the full-day program costs 32% more than the half-day programs ($1647 per child). The most striking question raised by Table 3.6 is "Why does the half-day program cost more than a full-day program for a CD child but not for an MD child?"

Although the difference between half- and full-day programs is only $199 per child, the half-day program is quite a bit more expensive than one would expect when considering that the half-day program is approximately half the hours of the full-day. The detailed cost analysis conducted for this study identified several reasons why the costs of half-day programs are higher than one would intuitively expect. As shown in Table 3.6 most of the cost differential is found in personnel costs.

Table 3.9 presents a breakdown of costs for 10 major personnel activities. The costs for Direct Instruction (or contact time) is subdivided by type of intervenor. Using costs for MD children as the standard, overall, full-day personnel costs are 27% higher than half-day costs. A comparison was made to determine in which areas CD costs were patterned differently from MD costs. These areas were direct instruction, travel, parent contact, CAPER, and consultant.

First, in the area of Direct Instruction, full-day MD costs were $437 higher than CD, and half-day MD costs were $313 lower than CD. Why did personnel costs fluctuate so dramatically across handicaps? Half-day CD children received 188% more speech services than half-day MD children and represent 38.2% of total instructional hours for the half-day program but only 7.7% of full-day instructional hours. This high number of hours of therapy in half-day program has a big impact on costs because 38% of the time, two professionals are working with the children: the classroom teacher and the therapist. This situation happens only 8% of the time in full-day programs. Also, when one child spends time with a therapist, the cost per child of the teacher's salary increases for those children remaining in the classroom. MD children received more speech time in the full-day program and more PT/OT time in the half-day program.

Table 3.11 shows the costs of providing one hour of contact time by intervenor for only those children receiving services. For example, all CD children were seen by the teacher, aide, and speech therapist, but only five (half) and four (full) by the PT/OT. Results show that per hour costs for therapists are higher (for both CD and MD) in the full-day program. The reason for this differential is due to the more frequent occurrence of individual child sessions in full-day programs (the half-day program used more small group sessions) and the more frequent use of therapist aides in the half-day program.

Table 3.11

Mean Cost Per Contact Hour Per Child Per Year
for Only Children Receiving Service

Variable	CD		MD	
	Half	Full	Half	Full
Teacher time	$17.73 (N=11)	$10.37 (N=11)	$15.72 (N=15)	$12.34 (N=15)
Aide time	8.65 (N=11)	3.94 (N=11)	6.26 (N=15)	4.43 (N=15)
Speech therapy	11.13 (N=11)	15.07 (N=11)	11.42 (N=13)	14.41 (N=12)
PT/OT	10.40 (N=5)	17.41 (N=4)	12.67 (N=7)	18.18 (N=8)

An examination of travel time (Table 3.9) shows full-day programs at a higher cost. Most travel time costs are due to therapists and consultants who must travel to the schools. Full-day programs are located in rural areas up to 100 miles from the therapists' and consultants' base. Half-day programs are located within 10 miles. Proportionally higher travel costs for CD half and MD full are due to those children receiving more therapy.

Although no parent contact hours were reported for half-day MD children, this appears to be an anomaly because of the teachers and children in sample. CAPER time would not be expected to differ across programs and seems to fluctuate only with MD half-day children, most likely due to the teachers in sample. Consultant spent more hours with half-day teachers of CD children with teachers of MD children. This was largely attributable to the faster growth rate of CD children. Visits to full-day programs were made regardless of handicap.

Comparing personnel cost differentials across handicaps for only the half-day program, CD children had 22 hours per child more speech therapy than MD children did (Table 3.10). Because of more therapy hours, the CD children required more therapist preparation time and travel time. The cost of parent contact time for each CD child was $95 (Table 3.9). No parent contact was made for MD children. Finally, half-day costs for inservice (and Other) and for CAPER testing time were higher for the CD children ($511.64) than the MD children ($392.06) (Table 3.9). Overall, Personnel costs across handicap for only the full-day program, show costs for MD children to be 11% higher than costs for CD children. MD children were associated with more teacher and PT/OT time, more preparation time, higher travel costs, more parent contact, and more CAPER testing time (Tables 3.9 and 3.10). CD children received more speech therapy.

Nonpersonnel costs include transportation (costs to operate bus), equipment (including furniture), and facilities (rental value, insurance, maintenance, and utilities) (see Table3.12). For all children, total half-day costs were lower than full-day costs. However, the equipment costs for half-day CD children were 1.17 standard deviation units higher than for full-day. This high cost was attributable to the more frequent use of tape recorders and record players in the half-day program.

Table 3.12

Mean Nonpersonnel Costs Per Child Per Year
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Transportation	104.55 (34.67)	185.00 (201.88)	107.33 (29.69)	114.73 (147.07)
Equipment	544.45 (132.55)	336.36 (226.45)	421.40 (48.40)	420.67 (237.33)
Facilities - school	519.73 (113.74)	661.73 (214.03)	414.20 (41.75)	685.67 (285.54)
Facilities - AEA	225.00 (0)	225.00 (0)	225.00 (0)	225.00 (0)
Total nonpersonnel costs	1393.73 (262.23)	1408.09 (564.87)	1167.93 (96.25)	1446.07 (518.00)

As shown under Budgeted costs in Table 6, full-day programs for MD children are $667 per child more expensive than full-day programs for CD children. The major cost differential is due to travel. MD children have higher transportation costs (bus driver's time, bus maintenance, and gas) than do CD children. Because full-day programs are in the rural areas, some districts bus children to another district for service rather than maintain classrooms with special programs. MD children are bused from other districts more frequently than are CD children.

A secondary cost differential results from MD children receiving more physical and occupational therapy than CD children. More therapy hours increases the costs of therapy equipment and travel. Travel costs for therapist traveling in rural areas (full-day program) are high in proportion to the hours of therapy provided to the children. For MD children, the cost of therapist travel is 276% of the cost of therapy time, and 200% for CD children. Finally, more time has been allocated to preparation for MD children than CD children by the classroom teacher and the therapists.

Contributed costs. Thus far, only costs appearing in district budgets have been considered. A comprehensive cost analysis requires a consideration of contributed as well as budgeted costs. The cost of contributed goods and services are presented in Table 3.13. It is expected that contributions would be similar across programs, however, children in full-day programs (both CD and MD) received substantially more contributed goods and services than the children in the half-day program. Parents contributed considerably more to the full-day program than parents contributed to the half-day program. An analysis of these parent contributions shows that parents of children in full-day programs spend over twice the hours conducting intervention programs in the home (297 hours) than parents of children in half-day programs (136 hours). Other major parent contributions in full-day program were transportation and lunch.

Table 3.13

Mean Contributed Costs Per Child Per Year
(Standard Deviation)

Variable	CD		MD	
	Half	Full	Half	Full
Parents				
Intervention time	316.18 (184.25)	945.64 (2089.58)	319.07 (306.68)	441.67 (415.84)
Transportation	46.27 (153.47)	301.00 (477.39)	39.27 (152.08)	156.13 (275.88)
Home space	9.64 (4.92)	20.36 (21.74)	11.40 (12.40)	19.93 (19.06)
Lunch	-	89.55 (58.69)	-	102.73 (66.01)
Snack	8.18 (1.89)	32.09 (49.29)	6.27 (.70)	15.60 (4.52)
Government lunch	-	37.27 (64.57)	-	32.33 (55.95)
Other	-	55.09 (94.35)	-	13.47 (52.16)
Total contributions	380.27 (192.97)	1481.00 (2139.38)	376.00 (365.23)	781.87 (459.95)

Interestingly, the parents of CD children in full-day programs contributed 199% more time than parents of half-day children and 114% more than full-day CD parents. District personnel provided additional information to help interpret these findings. Staff believe parents of CD children to be typically more cooperative with home intervention programs than parents of MD children. However, parents of half-day CD children are frequently single working mothers. Mothers of full-day CD children are more often married and nonworking which would permit more avaialble time for home intervention.

Total costs including contributed and budgeted costs are included were given in Table 3.6. When contributed costs are added to budgeted costs, the patterns observed earlier when only budgeted costs were examined change considerably. Now full-day programs are more expensive for both CD children (20% more) and MD children (10% more). Most of this change is attributable to parent contributions via spending time with their child in tutoring-type activities. Although parents of both CD and MD full-day children spend more time tutoring their child than parents of half-day children, the differential is much greater for parents of CD children.

Considering Cost and Effects Data Together

With the results of the outcome data, the budgeted costs, and the contributions, it is now possible to examine the question of cost effectiveness for half- and full-day programs for handicapped preschoolers in AEA #12. As will be shown below, the final answer to questions of cost effectiveness depend to some degree on how decision makers value various types of resources (e.g., "out-of-pocket" versus contributed resources) and outcomes (e.g., cognitive growth versus expressive language growth versus other unreported variables). This section will present information on the overall cost effectiveness of the two program options, potential for increasing cost effectiveness, and the assumptions and limitations of this particular study.

Overall cost effectiveness. Table 3.14 summarizes the data showing the program that provides the highest scores and the lowest costs for both CD and MD. If only budgeted costs are considered, full-day programs for CD children are more cost effective (i.e., less expenditures and greater gains) than are half-day programs. However, for MD children, half-day programs are more cost effective because the gains for MD children in half-day programs are equal to or better than full-day programs, but the costs are less.

Table 3.14

Display of the Highest Scores (+)
and Lowest Costs (+)

Variable	CD		MD	
	Half	Full	Half	Full
Effectiveness				
Expressive		+	+	
Cognitive		+	+	
Costs				
Budget		+	+	
Contributed	+		+	

When costs of contributions are included in the total costs, the answers are less clear. Full-day programs for CD children, which resulted in greater scores now cost more. Whether the higher score is worth the extra cost is a value judgment which must be made by local decision makers. More interesting, however, is the possibility that the extra gain for CD children in full-day programs may be attributable to additional parent involvement. As discussed earlier (see Table 3.13) parents of CD children in full-day programs contributed more than three times as much as parents in half-day programs ($1389/child versus $380/child).

By far the highest contributions of intervention time were made by parents of CD children in full-day programs. Perhaps the higher scores by full-day CD children are because of extra parent involvement. What would happen with scores of CD children in half-day programs if parents were involved at the same or higher levels? Also, if parent involvement is the key, why aren't the scores of MD children in full-day programs higher? Is it possible that parents can be more effective interventionists with CD children than with moderately or severely delayed MD children? Answers to such questions will require further research, but the preliminary data obtained in this study are both enlightening and provocative.

Potential for increasing cost effectiveness. In addition to questions of final status, a cost analysis such as the one conducted for these programs provides important information about potential program modifications which may contribute to improvements in the cost effectiveness of a particular alternative. Described briefly below are several activities or situations which account for a seemingly high proportion of costs in one or both programs.

> Therapy in full-day programs. First, therapists who provide service to children in the rural areas often travel long distances for each visit made to a school district (often only one hour). The breakdown of the therapist salary for providing therapy in rural areas is one-third for instruction and two-thirds for travel time. The cost for therapy in full-day programs is considerably higher than it would be if the therapist were located closer to the school district. This raises questions about the cost effectiveness of providing therapy in a rural setting.
>
> Consultants in full-day programs. The cost of providing AEA consultants to the rural sites is also quite high due to the cost of travel. Most of the cost of providing consultants once a week or biweekly is to cover the one- or two-hour round travel. Not only is time on the road covered by salary, but gas and car upkeep is reimbursed through travel vouchers.
>
> Engaged learning time. Although the evidence is not conclusive because data were based on teacher recall of a "typical week," there is some indication that the amount of engaged learning time in a full-day program is not much higher than it is in the half-day program. This apparent discrepancy occurs because of more frequent breaks and the fact that major activities in the afternoon hours of the full-day program consist of lunch (1 hour) and nap time (45 minutes).
>
> Use of parents as interventionists. As noted earlier, parents are used as interventionists much more extensively in full-day programs than in half-day programs. To the degree that parents are effective interventionists, this will have dramatic impact on both costs and effects.

Music, art, and PE programs. Children in half-day programs are provided with much more instruction in music, art, and PE. Because the costs of providing these programs are high, the cost/instructional hour for half-day programs is increased. Whether such programs should be offered is again a value judgment. But, because the outcome measures used in this study did not test for changes that would be brought about by music, art, and PE, gains per dollar spent would be reduced.

Differential levels of therapy. The amount of speech therapy provided for CD children in half-day programs (see Table 10) is at least double that given to children in other conditions. This is surprising and it is questionable whether the amount of therapy given has surpassed the point of diminishing returns. Further investigation is needed to explain why CD children in half-day programs receive more therapy than children in other programs and whether this additional therapy can be justified in terms of child growth.

When making a comparison of "half-day" versus "full-day" programs, there is a danger that people will incorrectly conceptualize the two alternatives as fixed, discretely defined, and unchangeable. It must be remembered that all results reported in this study are based on programs as they were operating at the time of the study. As should be obvious, there are many ways in which full-day and/or half-day programs could be altered (such as those mentioned above) and still remain a full-day or half-day program. Such changes could easily change either the costs or the effectiveness of the program.

Assumptions and limitations of this study. The data reported herein are based on a number of assumptions and limitations which are important to keep in mind as the results are interpreted. First, the validity of all conclusions rests on the assumption that children in full-day and half-day programs were comparable in every way at the beginning of treatment except for the type of program in which they were enrolled. To assure comparability, the final sample of children were carefully matched on variables of age, time in program, and various measures of developmental progress at the time of program entry.

Second, it is possible that factors only tangentially related to the half-day/full-day comparison could have skewed results (particularly for the cost data). To protect against this, the analyses considered as many alternative explanations as possible. For example, average teacher salary for each group was checked to see if the more senior (and hence the more expensive) teachers just happened to be teaching the children selected to be in one of the four groups (half-day CD, MD; full-day CD, MD). There were no statistically significant differences in teacher salary between groups. Also, number of children per class was examined and there were no differences between groups. Based on the interviews and on-site observations, it was concluded that there were no differences between curriculum materials, operating procedures, philosophical orientation, or unusual therapy requirements which would confound the half-day versus full-day programs.

Finally, outcomes in this study were limited to the cognitive and expressive language strands of the CAPER which are highly correlated with well-established standardized measures. These measures provide a good data base, but further valuable data could be obtained by collecting data in other developmental areas using diagnosticians who are blind as to the purposes of the study. Also, this study was limited to outcomes in cognitive and expressive language growth due to the availability of CAPER scores. This does not imply that other variables such as improved family functioning or reduced family stress are not equally important outcomes. Future cost-effectiveness analyses of these programs should attempt to cast as broad a net as possible for outcome measures.

Conclusions

This study was designed to provide initial data on a cost-effectiveness comparison of half-day versus full-day programs to demonstrate the utility of a comprehensive economic model for cost analysis and to identify strategies for further cost-effectiveness analyses for half-day versus full-day programs for preschool handicapped children.

Initial Data on Cost Effectiveness

Assuming the programs continue to function as they are now functioning, for CD children, the full-day program is more cost-effective if contributed parent time is ignored. In other words, higher gains are achieved at lower costs. If parent time is included, one must decide whether the additional costs of full-day programs are justified by the higher gains. For MD children, the half-day program is more cost effective whether or not parent time is considered. In other words, similar test scores are received by MD children in the half- and full-day programs, but half-day programs cost less.

Utility of a Comprehensive Economic Model for Cost Analysis

Two of the distinguishing characteristics of the economic model used in this cost-effectiveness analysis are that (a) all resources (budgeted and contributed) were accounted for, and (b) data were collected so they could be disaggregated to yield data with the child as the unit of analysis. Among the important insights gained as a result of this approach are the following:

1. The ability to consider cost-effectiveness issue separately for CD and MD children even though they are taught in the same classes.

2. The differential amount of therapy for half-day CD children versus children in the other three groups.

3. The differences in cost-effectiveness ratios when contributed parent time is included or excluded for CD children and the possibility that additional parent time might be in part responsible for higher gains made by full-day CD children.

4. The contributions to total costs for individual children of activities such as consultant travel, therapist travel, art/music/PE activities, and shared facilities.

5. The suggestion that amount of engaged learning time is very similar between half-day and full-day programs.

Information such as that cited above would be unavailable in cost analyses which arrive at per student costs by dividing total budget figures by the number of children served. Yet, the type of data cited above is exactly the type of information needed by administrators to make valid decisions.

Suggestions for Future Research

The results of this study provide some initial information about the cost effectiveness of half-day versus full-day programs for preschool handicapped children. But like most initial studies, it also lays the foundation for further work. Based on these findings, it seems that studies in at least the following three areas should be pursued.

Further post hoc cost-effectiveness studies. The study described in this report was a post hoc quasi-experimental design. In other words, children to be compared were in preexisting groups and were selected for inclusion in the comparison samples after the "treatment" was largely completed. Although there are inherent weaknesses in this type of a design, one can be quite confident of results if matching can be done on pretreatment variables as was done in this case and if replications can be done with additional groups of children. Further work of the type described in this report would be valuable in the following areas. First, additional children could be included in the half-day/full-day samples because of new children entering the program. Second, more comprehensive objective outcome data (including family functions) could be collected by "blind" observers. Third, this study was limited to children who were enrolled in programs during the 1982-83 year. Archival records at AEA #12 suggest that there are about 40 half-day/full-day matched pairs of CD and MD children who have previously graduated from the preschool programs which could be included in a similar study. Including these children would allow an examination of the long-term cost effectiveness of the two programs. Fourth, much of the data collected in this study depended on teacher recall of a "typical week." More precise data for these variables could be collected by observation and selective time tracking.

Effect of parent involvement. Data collected in this study suggested that the additional involvement of parents as interventionists with their full-day CD children may have been responsible for the higher scores of these children. Although suggestive, the data in this study were by no means compelling. An excellent research study would be to randomly assign parent/child pairs of children (both CD and MR in both half-day and full-day programs) to experimental conditions involving different levels of parental involvement (high, medium, low). More precise records on actual involvement and outcome measures in a variety of areas could then be used to do a more definitive cost-effectiveness analysis of this variable.

Randomly assigned comparison of half versus full day. A more rigorous approach to comparing the cost effectiveness of half-day versus full-day programs would be to randomly assign children to either half-day or full-day programs and then collect the same types of cost and effects data as described earlier. This approach would avoid the problems inherent in quasi-experimental designs, but would also involve substantial logistical and administrative difficulties. Therefore, it is recommended that such a possibility be reserved for the future until further data are collected using options such as those described above.

CHAPTER IV

LONGITUDINAL STUDY OF EARLY INTERVENTION WITH HEARING IMPAIRED CHILDREN

Introduction

This research project was done to investigate the long-term impact of early intervention on hearing impaired children. This study will be reported in five sections. The first section will include a problem statement and a discussion of the basic research questions. The next section will present a review of literature on early intervention programs for hearing impaired children. The third section will be a discussion of research methods and procedures and will include a description of the research model, sample selection, selection and development of measures, testing, and data analyses procedures. The fourth section will present the results of the study and a discussion. Finally, implications of the research project and recommendations for future research will be discussed.

Problem Statement and Research Questions

Problem Statement

Prelingual hearing impairment afflicts a relatively large number of children each year (approximately one in 1,500 births). The handicap of hearing impairment is particularly devastating to the child during the first few years of life when language acquisition occurs (Clark & Watkins, 1978; Northern & Downs, 1974). To ameliorate this serious problem, many early intervention programs for hearing impaired children have been established throughout the country during the past few years.

One of the most successful and widely disseminated of these programs is the SKI*HI program which has been approved by the Joint Dissemination Review

Panel for national dissemination. The SKI*HI model has been used with over 6,000 children during the last nine years and is currently being used with over 1,500 children in 90 sites throughout the country.

The validation of SKI*HI for national dissemination was based on data from a quasi-experimental design where 33 children who received treatment prior to 30 months of age were compared to 27 children who were identified after 30 months of age and had not yet received treatment. Comparability of the two groups was established on degree and type of hearing loss, age, and other demographic variables. Comparison of the two groups demonstrated that the group with earlier intervention was significantly better on use of residual hearing, auditory development, receptive and expressive language, and parental involvement with their child's early education (Clark, 1979).

Unfortunately, there are no data on these hearing impaired children to determine the long-term effects of early home programming on them. Since the untested assumption upon which these intervention programs are operating is that early gains will be maintained and will impact on other areas, there is vital need for research to be conducted on the long-term impact of early intervention on hearing impaired children.

Any serious effort to examine the cost-effectiveness of early intervention for the hearing impaired would have to consider the effect of these long-term outcomes. Therefore, since such longitudinal data are lacking, it is impossible to fully justify continuance of the national and local resources being used in early intervention programs for the hearing impaired.

Perhaps, knowledge of the long-term impact of early intervention is most important for hearing impaired children and their families. Longitudinal data are needed to help these deaf youngsters and their families know if they are receiving services that provide positive impact on their lives beyond treatment time.

Research Questions

The main purpose of this study was to investigate the long-term impact of home intervention on hearing impaired children. The basic research question that emerged was, "Do hearing impaired children who received home intervention earlier in their lives perform better than hearing impaired children who did not receive home intervention earlier in their lives on measures of language, academic achievement, and psycho-social behaviors?" In addition to this most basic question, two other important questions emerged: "Do children who received home intervention before age 2 1/2 perform better than children who did not receive intervention until after age 2 1/2 on measures of language, academic achievement, and psycho-social behaviors?" "Do children who received no home intervention but attended preschool perform better than children who did not receive home intervention and did not attend preschool on measures of language, academic achievement, and psycho-social behaviors?"

Review of Literature

During the last 15 years, there have been only a very few studies done on the long-term impact of early intervention for hearing impaired children. The large majority of these studies have investigated the effects of child-oriented, center-based programs (preschools or nursery schools) on hearing impaired children. Only a very few studies have investigated the impact of parent programs on hearing impaired children and none of these studies have looked specifically at home (versus center-based) parent programs such as the SKI*HI program.

This review of literature contains first a discussion of the studies that have been done on the long-term effects of center-based, child-oriented programs on hearing impaired children. Next, a discussion of studies done on the impact of parent programs on hearing impaired children will be presented.

Child-Oriented Intervention with Hearing Impaired Children

The studies on the long-term effects of nursery and preschool programs on young hearing impaired children are inconclusive. Research done primarily during the 1960s did not yield conclusive evidence for positive sustained impact of preschool intervention. Craig (1973) administered comprehensive batteries of speechreading and reading tests to 151 children at the Western Pennsylvania School for the Deaf and the American School for the Deaf (Connecticut) who had attended preschool earlier in their lives. He also tested a control group of 101 children from the same institutions who had not attended preschool. He found no statistically significant differences between the experimental and control groups after the children had been in the primary grades for three to four years. Similar results were found by Phillips (1963) who tested 9-year-old severely and profoundly hearing impaired children from eastern United States schools for the deaf including the Lexington School (New York) and the American School for the Deaf (Connecticut). No statistically significant differences between the experimental preschool group and the control no-preschool group were found on measures of arithmetic achievement, language achievement, and socialization.

Vernon and Koh (1970) compared children who had experienced three years of oral preschool (John Tracy Preschool Program) to children with no preschool who had: (a) oral home environments, and (b) manual communication home environments. Groups were matched on age and IQ. There were 23 subjects in the experimental group and 23 subjects in each of the two control groups. Participation in preschool did not seem to be the determining factor of later academic achievement advantages. At age 18, children who experienced an oral preschool program did not score statistically significantly higher than the no-preschool children from oral home environments on the Stanford Achievement Test. However, the experimental preschool children scored statistically significantly lower than the no-preschool children from manual communication home environments on the Stanford subtests of paragraph meaning and reading.

Balow and Brill (1975) did a follow-up study of the Vernon and Koh research. They studied 264 John Tracy Preschool Program graduates who were attending the California School for the Deaf at Riverside. This sample was considerably larger than the 23 subjects used in the Vernon and Koh study. The Tracy graduates were compared to other students at the Riverside School who had not had preschool programming. The John Tracy graduates scored statistically significantly higher on the Weschler Adult Intelligence Scale and on the total battery of the Stanford Achievement Test than the control group. An analysis of covariance showed that a statistically significant difference in achievement remained when the effects of IQ were controlled.

Moores, Weiss, and Goodwin (1978) conducted a six-year longitudinal study on preschool programs for deaf children. Subjects included hearing impaired children who had attended seven different preschools which emphasized different communication methodologies. The hearing impaired children were shown to have almost identical scores to hearing children in the standardization sample on the Illinois Test of Psycholinguistic Abilities and the reading subtest of the Metropolitan Achievement Test Primer Battery. However, communication success as measured by the Receptive Communication Scale (a tool developed by the research team) depended on the type of preschool program in which the children had participated. Children scored highest who had been in speechreading and signing preschool programs. These children were followed by those who had experienced speech and fingerspelling preschool programs; these were followed by children who had been in preschool programs utilizing speech and audition. Children scored lowest who had been in programs utilizing auditory receptive communication only.

Intervention Directed to Parents of Hearing Impaired Children

Most of the studies done on the long-term impact of parent intervention on hearing impaired children have involved center-based programs of parental instruction. Parents have received training in clinic settings or demonstration home settings in how to provide meaningful language stimulation for their hearing impaired children.

Lowell (1967) studied hearing impaired children whose parents had received training in a demonstration home while the children were 1 to 3 years of age. After the parents completed the program, the language growth of the children was monitored. Using the modified Boone Scales of Linguistic Encoding and Decoding, two groups of experimental children showed statistically significant gains for months after the program was completed. Two control groups of children who had been enrolled in traditional nursery school and whose parents did not receive instruction did not show statistically significant improvement.

Ewing and Ewing (1964) found that deaf children whose parents had received center-based guidance were linguistically superior to children whose parents did not have the benefit of such training. Gains for the experimental children were statistically significantly greater than for the control children in the articulation of spoken English, use of colloquial English, vocabulary, spontaneity of vocalization, and variety of pitch and intonation during the first three to four years of elementary school. Parents who had received training were judged to be more cooperative with the school in continuing the child's home language training than control parents. Teacher interviews were utilized to obtain this information.

Horton (1976) studied six hearing impaired second grade children whose parents had received training in the Mama Lere Demonstration Home. The children were 0 to 3 years at the time of intervention. Two control groups were also studied: (a) five hearing impaired second grade children whose parents had not received instruction (but who had been fit with hearing aids at a median age of 4 years), and (b) six hearing second grade children who were in the same school as the intervention group. The severity of hearing loss for the experimental and control hearing impaired groups was not statistically different. Fifty consecutive utterances produced by the children in each of the above groups were analyzed according to Lee's Developmental Syntax Types. The findings revealed that the language competence of the experimental group was not statistically different from the hearing control group. However, there were statistically significant differences between the experimental and no-intervention hearing impaired groups favoring the experimental group. For example, the intervention group produced, on an average, 75% of their utterances on the sentence level compared to only 32% for the no-intervention control group. Only 8% of the intervention group's utterances were of the noun type (immature construction) compared to 19% noun type construction usage in the control group. In the intervention group, 79% of the utterances were mature verbal constructions while only 19% of the utterances in the control group were of this type.

In another study, Horton (1976) compared six hearing impaired second grade children whose parents had received training in a demonstration home to 53 hearing second grade children. The Metropolitan Achievement Test was given to both groups. The mean percentile ranks for both groups were virtually equivalent in the area of reading. The hearing impaired children scored slightly lower on the math subtest.

Studies on the long-term effects of home visit programs for parents of hearing impaired children (such as the SKI*HI Program) have not been reported in the literature during the last 15 years. Lack of research on such programming is most unfortunate because:

1. Parent-oriented programs have been shown to have longer lasting positive effects on children than child-oriented programs without parental participation (Bronfenbrenner, 1974).
2. Home programs are claimed to be superior to clinic or demonstration programs because:
    a. The home is the parents' and child's natural environment.
    b. Intervention in the home allows for utilization of natural prime times for language stimulation (such as bath time, getting child dressed, etc.) (Clark & Watkins, 1978; Shearer & Shearer, 1976).
    c. In home programming, parents do not need to get dressed and go out to a center. Near 100% attendance was reported by Watkins (1971) in the Utah home visit parent infant program.
    d. Studies done on home visit parent programs for other handicaps such as visual impairment and mental retardation reveal that these programs are more cost effective than center-based parent programs (Macy & Carter, 1980).

It is evident, then, that research on the long-term effects of home visit parent programs (such as SKI*HI) is greatly needed.

Summary

The scanty research available on long-term effects of preschool programming for hearing impaired children is inconclusive. Studies done during the 1960s reveal that children who experience preschool do not score higher on academic achievement than control children. However, in later studies, it is shown that children who attended preschool are comparable to hearing controls or superior to hearing impaired controls on some academic measures. Some research indicates that the type of preschool program (favoring sign language utilization) may be a more important indicator of later academic success than participation in preschool per se.

Studies have been done on the long-term impact of center-based programs for parents of young hearing impaired children. Children whose parents have been in these programs show greater language competence and academic achievement in the first few primary grades than children whose parents have not participated in such programs. Research on the long-term impact of home visit parent programs (such as the SKI*HI model) is not available.

Methods and Procedures

Research Model

The research model used in the study was a longitudinal research design which studied the relationship over time of home intervention to language, academic achievement, and psycho-social performance of hearing impaired children. The design was similar to the Stanley and Campbell ex post facto design because treatment administration (home intervention) had already occurred and current performance levels were assessed. The general statistical model used was analysis of covariance and multiple comparison procedures. Specific measures were taken to control for threats to internal and external validity that were inherent in the research model as shown in Table 4.1.

Sample Selection

In order to examine the issues of home intervention vs. no-home intervention, early vs. late home intervention, and preschool vs. no preschool, four research groups were selected.

Group 1: Children who had a home intervention program (SKI*HI) before age 2 1/2 and who attended preschool.

Group 2: Children who had a home intervention program (SKI*HI) after age 2 1/2 and who attended preschool.

Group 3: Children who did not receive home intervention ages 0-5 but who did attend preschool.

Group 4: Children who did not receive home intervention ages 0-5 and who did not attend preschool.

The subjects for groups 1 and 2 were children who participated in a study done by Clark and Covert (Clark, 1979). In this study, 33 children who had an average 9 months of treatment before age 2 1/2 were compared to 27 children who had no treatment until age 2 1/2.

In this current research study, the early treatment children in the Clark and Covert study were matched to the late treatment children in that study on the variables of hearing loss, age, existence of other handicaps, and preschool attendance. Attrition attributed to parent refusal to include the children in the study, out-of-state moves, and unsuccessful matching, resulted in a final N of 23 for both groups. These children had received treatment earlier in their lives in the form of the SKI*HI model. This model contained

Table 4.1

Controls for Threats to Internal and External Validity

INTERNAL VALIDITY:	
1. History:	a. Control group used. (Likely same historical factors operated on experimental and control children so history non-differential). b. Factors suspected of differential influence were either matched or, if highly correlated with dependent variables, were treated as covariates: 1) amount and type of preschool 2) amount and type of therapy
2. Maturation:	a. Control group used (Likely same maturation factors in operation for control and experimental children so maturation non-differential). b. Factors suspected of differential influence were either matched or, if highly correlated with dependent variables, were treated as covariates: 1) age 2) bouts with middle ear infections
3. Testing	a. There were no pretest effects on child scores.
4. Instrumentation	a. Diagnosticians blind to group membership of children. b. Fixed instrument used. c. All tests given during same two-week period.
5. Regression	a. Groups were not selected on basis of extreme prescores.
6. Mortality	a. Attrition rates were slightly different between groups 1 and 2 (30% and 15% respectively). However, no reason to suspect differential attrition (such as children moving out of state).
7. Differential Selection	a. Factors suspected of being different for groups matched or, if highly correlated with dependent variable, treated as covariates: 1) hearing loss 2) other handicaps 3) current school placement 4) index of social position (occupation and education of parents) 5) age of parents 6) number of parents 7) hearing status of parents 8) amount of treatment (for groups 1 and 2) 9) lapsed time since treatment (for groups 1 and 2)
EXTERNAL VALIDITY:	
1. Interaction of Testing and Treatment	a. Pretests were not given so possibility did not exist of subjects' responses (as a result of pretest effects) being non-generalizable to untested populations.
2. Interaction of Testing and Treatment	a. Study purports generalizability of results only to populations of hearing impaired children with characteristics similar to children in this study.
3. Reactive Effects	a. Children too young during treatment to be subject to reactive effects. b. At testing time, all children simply informed they were to participate in some activities to see how well they were doing in school. Therefore, John Henry Effect (subject attempt to prove or disprove treatment theory) not likely a problem. c. Since hearing impaired children are regularly tested, Hawthorne effects (improved or worsened performance as a result of "test taking") minimized.
4. Multiple Treatment Interference	a. Series of treatments were not given so possibility did not exist of one treatment distorting another treatment, making test results of any one treatment ungeneralizable to other treatment applications.
5. Generalizability to Other Treatment	a. Treatment given by different parent advisors.
6. Generalizability to Other Measures	a. Multiple measures used.
7. Generalizability to Other Times (beyond immediate post-treatment)	Since an important purpose of this study was to determine generalizability of treatment effect (beyond immediate post-treatment time), this was not a threat. However, study purports generalizability of treatment effect only to those times beyond treatment of children included in this study.

a child identification component, regular weekly home visits by a professional to the child's home, and medical, audiological, and psychological ancillary services (see description of treatment in Appendix 4-A). At the time of the current study, children in groups 1 and 2 were in 31 schools scattered throughout the state of Utah.

Children in groups 3 and 4 were selected from a pool of sites that did not have a home intervention program in existence long enough to yield "graduates" currently 6-13 years of age. Four sites were selected from this pool:

1. Tennessee School for the Deaf, Knoxville, Tennessee.
2. Alabama Institute for the Deaf, Birmingham, Alabama.
3. Memphis Oral School for the Deaf, Memphis, Tennessee.
4. Local school districts in Utah and Idaho (Cache County School District, Logan, Utah; Logan City School District, Logan, Utah; Preston School District, Preston, Idaho).

Children from these sites were carefully matched with the children in groups 1 and 2 on four variables listed above. A total N of 96 (23 in each of the four groups) resulted.

Selection and Development of Measures

Fifteen SKI*HI Model impact areas were defined and a group of professionals who work with the model were asked to rate how the impact areas were directly affected by the intervention program. They rated nine impact areas as most important. Outcome variables for these nine impact areas were then defined and included child receptive and expressive language, communication, academic achievement, speech, social-emotional adjustment and self-concept, and parent attitudes, communication, and hearing aid management.

Potential instruments to measure these outcome variables were next carefully researched. It was determined that appropriate measures were not available for parent attitudes, communication, and hearing aid and communication management. So instruments to measure these variables were developed specifically for this study (see measures in Appendix 4-B, 4-C, and 4-D and description of development of measures in Appendix 4-E). Commercially available measures were obtained for the other outcome variables.

Table 4.2 contains a list of the outcome variables and the instruments used to measure those variables.

Testing

Clearance was obtained to test the human subjects in this study from the Utah State University Institutional Review Board. Clearance was also obtained to conduct child testing from the parents of each child in the study and from the administrator of the school each child was currently attending.

Eight diagnosticians were recruited and were given three days of training at Utah State University to administer all the measures (see Training Agenda, Appendix 4-F). The diagnosticians were graduate students in Communicative Disorders and Special Education at Utah State University who knew sign language and had experience or course work in psychometrics.

The diagnosticians conducted child testing at 37 schools in Utah, Idaho, Alabama, and Tennessee. All testing was done in a two-week period of time. Each child received two 1-1/2-hour test sessions over two days.

Parent Attitude Scales and Parent Questionnaires were sent to all parents of the children in the study. Eighty-four percent of the parent attitude scales were returned and all information was returned on the parent questionnaires.

Table 4.2

Outcome Variables and Measures

Outcome Variable	Measures
1. Receptive language	1. Carrow Test of Auditory Comprehension of Language 2. Peabody Picture Vocabulary Test
2. Expressive language	3. Lee's Developmental Sentences Scoring 4. Expressive One-Word Picture Vocabulary Test (Gardner)
3. Communication	5. Communication Inventory and Teacher Rating (developed for this study) see Appendix 4-B
4. Academic achievement	6. Woodcock-Johnson Psycho-educational Battery: Part II. Tests of Achievement (Reading, Math, Written Language)
5. Speech	7. Arizona Articulation Proficiency Test
6. Social-emotional adjustment, self-concept	8. Meadow-Kendall Social-Emotional Assessment Inventory for Deaf Students
7. Parent attitudes	9. SKI*HI Parent Attitude Scale (developed for this study) see Appendix 4-C
8. Parent management of hearing aid	10. Parent Questionnaire (developed for this study) see Appendix 4-D
9. Parent communication	11. Parent Questionnaire (developed for this study)

Data Analysis

Tests were scored for use in the data analysis in three major ways. First, commercially available tests were scored according to test protocols. Second, scoring procedures for instruments specifically designed for this study were devised and these measures were then scored. Finally, videotaped language sample and articulation tests were transcribed and scored according to instruction manuals. Because scoring of the Arizona articulation test required some subjective judgments as to the correctness of sound production, an interrater reliability study was done on 15 of the children in the research project. This study yielded a reliability coefficient of .96.

In order to answer the basic research questions about differences between groups of children who received home intervention vs. no home intervention, early home intervention vs. late, and preschool vs. no preschool, analyses of covariance and multiple comparison procedures were used to determine these group differences. In addition, effect sizes to determine educational significance of the research data were determined.

In order to perform these analyses, test scores obtained above on 36 dependent variables were entered onto computer coding sheets along with 22 potential covariates. The potential covariates were obtained from school record information, the Parent Questionnaire, and from an analysis of treatment data on children in groups 1 and 2 who participated in the Clark and Covert 1979 study. Coded data were then transferred to computer disk for analysis.

Potential covariates were then correlated with the dependent variables. Six covariates correlated with most of the dependent variables at a level of .3 or higher and were subsequently selected as the final covariates to be controlled in the analyses. They included hearing loss, age, existence and severity of other handicaps, age of mother, Hollingshead (1957) Index of Social Position (derived from the parent education and occupation items on the Parent Questionnaire), and number of childhood middle ear infections. Multiple R's were obtained to determine the relationship of each dependent variable to the covariates collectively. The larger the relationship (multiple R), the more need was evidenced to covary on the six factors.

Next, overall differences among groups were obtained by performing a univariate analysis of covariance with multiple covariates. In this analysis, group differences were determined for each dependent variable while covarying on the six covariates. A multivariate analysis of covariance was also performed. Dependent variables were categorized into the four logical groups of language/communication, academic achievement, psycho-social behaviors, and parent attitudes. Group differences were then obtained for each dependent variable category while covarying on the six covariates. This measure provided additional indication that group differences existed and confirmed group differences for individual measures within dependent variable categories.

Analyses of specific group differences were next performed on comparisons that were considered of primary importance because they dealt with the issues of home intervention vs. no home intervention, early vs. late home intervention, and preschool vs. no preschool. In addition, analyses of specific group differences were obtained for other comparisons of secondary interest which compared one of the two home intervention groups to one of the two non-home intervention groups. Multiple t-tests were performed on pair-wise contrasts of all dependent variables that were statistically significant for the four research groups. These comparisons included group 1 vs. 2, 3 vs. 4, 1 vs. 3, 2 vs. 3, 1 vs. 4, and 2 vs. 4. In addition, planned orthogonal contrasts were used to compare combinations of group means with other group means. These comparisons included groups 1 and 2 vs. 3, 1 and 2 vs. 3 and 4, and 1 and 2 vs. 4. It is best if the comparisons in planned orthogonal contrasts are orthogonal to each other (independent of each other). It was determined that the group 1 and 2 vs. 3 and 4 comparisons were orthogonal. However, the other two contrasts were not orthogonal. This was not considered serious, however, since the alpha level was raised only slightly (increased chance of Type I error).

Finally, it was determined if all primary and secondary comparisons were educationally significant. The technique used to obtain this information was effect size analysis. In this analysis, treatment groups were pitted against control groups such as the early home intervention group (treatment) vs. the late home intervention group (control). Effect sizes, or differences between these groups in terms of standard deviation units, were then determined.

Results and Discussion

Covariate Selection and Analyses of Overall Group Mean Differences

Multiple R analysis. Since covarying was to be done on the six covariates collectively, multiple R tests were conducted to determine the relationship of the covariates to each dependent variable. The results of this analysis are in Table 4.3.

Since the covariates account for over 60% of the variance of 11 dependent variables and over 50% of the variance of 24 dependent variables, the need to covary on the six factors is obvious.

Analysis of covariance. In order to determine overall group mean differences, two analyses of covariance were performed: univariate analysis

Table 4.3

Multiple R's for Dependent Variable

Dependent Variable	Multiple R
Woodcock Johnson Raw Scores:	
Letter/Word Identification	.60
Word Attack	.58
Passage Comprehension	.66
Calculation	.73
Applied Problems	.64
Dictation	.61
Proofing	.61
Peabody Picture Vocabulary Test:	
Raw Score	.57
Standard Equivalent Score	.55
Age Equivalent Score	.58
Test of Auditory Comprehension of Language Raw Score	.63
Communication Inventory Raw Score	.59
Communication Rating by Teacher	.49
Expressive One-Word Picture Vocabulary Test Raw Score	.61
Arizona Articulation Proficiency Test:	
Raw Score	.74
Consonant Score	.71
Lee's Developmental Sentence Scoring:	
Raw	.52
MLU	.56
Parent Attitude Scale:	
Total Raw Score	.47
Reactions to Outside Help Raw Score	.44
Anxiety/Guilt Raw Score	.46
Acceptance Raw Score	.41
Meadow-Kendall Social-Emotional Assessment:	
Social Adjustment Raw Score	.55
Self-Image Raw Score	.51
Emotional Adjustment Raw Score	.51
Parent Questionnaire Raw Scores:	
Time Hearing Aid Worn	.52
Time Spent Reading	.21
% Solitary vs. Group Play	.38
Number of Friends	.24
Child's Attitude Toward School	.45
% of Child's Communication Understood by Family	.59
% of Child's Communication Understood by Non-Family	.60
% of Family Communication Understood by Child	.41
% of Non-Family Communication Understood by Child	.40
Time Spent Communicating With Child	.55
Child Behavioral Rating	.23

of covariance with multiple covariates and multivariate analysis of covariance. Results of these analyses are shown below in Table 4.4.

Mean scores are listed from highest to lowest with the group number in parentheses next to the mean. The possible number of points for each dependent variable is also given.

It is important to note on variables 20-23, a larger mean represents a smaller percent of understood communication. Higher scores on three other variables also indicate poorer performance: variable 16 (where higher scores indicate more consonant errors), variable 30 (where higher percent scores indicate more solitary vs. group play), and variable 35 (where higher scores reveal poorer child attitudes toward school).

Mean differences that are statistically significant at a .1 level are noted with asterisks. This alpha level is not considered too liberal (increased chance of Type I error) because of the following:

1. High power values:

	Medium-sized difference	Large-sized difference
a. Power at .05:	82%	99%
b. Power at .1:	89%	99%

(4 groups 23 subjects/group, 6 covariates)

2. Effect sizes consistently favoring the treatment groups.
3. Consistency of p values of variables that are highly correlated.

Total group standard deviations and within-group errors (MS_e) are given in the table. Also given are F values for the Wilk's Multivariate Test along with the significance levels of these F values.

Discussion. As revealed in Table 4.4, statistically significant differences among groups exist for the majority (67%) of the dependent variables. In addition, when dependent variables are categorized into logical

Table 4.4

Results of Univariate Analysis of Covariance with Multiple Covariates and Multivariate Analysis of Covariance

	Dependent Variables	F-test p value	Mean adjusted scores by group				Possible points for each dependent variable	Group S.D.	MS_e
ACADEMIC ACHIEVEMENT Wilks F = 2.42 p = .001	1) Woodcock-Johnson: Letter/word identification	.007*	23.71 (1)	23.60 (2)	17.54 (3)	16.28 (4)	54	9.08	50.40
	2) Word attack	.001*	8.27 (2)	6.36 (1)	4.28 (3)	1.44 (4)	26	5.96	21.72
	3) Passage comprehension	.062*	7.68 (2)	6.47 (1)	5.97 (3)	4.23 (4)	26	4.58	11.92
	4) Calculation	.000*	13.43 (2)	12.90 (1)	8.13 (3)	6.45 (4)	42	6.42	15.14
	5) Applied problems	.076*	17.80 (1)	15.94 (2)	13.18 (3)	11.18 (4)	49	8.61	44.84
	6) Dictation	.065*	11.95 (2)	10.35 (1)	8.32 (3)	6.86 (4)	40	6.82	29.72
	7) Proofing	.083*	4.08 (2)	3.93 (1)	2.76 (3)	1.18 (4)	29	3.97	10.09
LANGUAGE/COMMUNICATION Wilks F = 1.73 p = .006	8) Peabody Picture Vocabulary Test: Raw score	.115*	63.34 (1)	54.76 (2)	49.65 (4)	48.47 (3)	175	21.97	335.68
	9) Standard score equivalent	.073*	52.07 (1)	44.62 (2)	37.11 (3)	35.81 (4)	160	21.35	321.82
	10) Mental age	.120*	67.71 (1)	62.56 (2)	54.02 (4)	53.88 (3)	175	21.99	333.83
	11) TACL	.146*	80.60 (1)	77.69 (2)	72.62 (3)	71.36 (4)	101	14.84	137.08
	12) EOWPVT (Gardner)	.012*	62.91 (2)	61.24 (1)	51.54 (4)	50.71 (3)	110	16.51	167.05
	13) Communication Inventory	.055*	36.24 (1)	33.78 (3)	33.19 (2)	29.91 (4)	40	6.79	30.24
	14) Teacher Rating of Communication Skills	.149*	3.97 (1)	3.48 (2)	3.46 (3)	3.05 (4)	5	1.07	.91
	15) Arizona Articulation: Raw Score	.018*	66.12 (1)	65.07 (2)	58.46 (3)	43.44 (4)	100	29.19	381.30
	16) Consonant Error	.309	32.43 (4)	26.24 (1)	25.23 (3)	24.24 (2)	54.5	17.99	170.82
	17) DSS: Mean Length of Utterance	.485	6.81 (2)	6.23 (4)	6.21 (1)	5.45 (3)	Unlimited[a]	3.23	7.66
	18) Raw Score	.010*	8.14 (1)	5.83 (2)	4.9[illegible] (3)	3.53 (4)	14	3.99	11.15
	19) Time Hearing Aid Worn	.000*	3.85 (2)	3.72 (1)	2.98 (3)	2.42 (4)	4 (76-100% of child's waking hours)	1.00	.58
	20) % of Child's Communication Understood by Family	.054*	2.69 (4)	2.22 (3)	2.04 (2)	1.83 (1)	4 (0-24%)	.94	.58
	21) % of Child's Communication Understood by Non-Family	.002*	3.96 (4)	3.38 (3)	2.88 (2)	2.52 (1)	4 (0-24%)	1.17	.91
	22) % of Family Communication Understood by Child	.138	2.53 (4)	2.52 (3)	2.09 (2)	1.91 (1)	4 (0-24%)	.92	.73
	23) % of Non-Family Communication Understood by Child	.002*	3.83 (4)	3.82 (3)	2.95 (2)	2.43 (1)	4 (0-24%)	1.26	1.27
	24) % Time Communicating with Child	.844	3.55 (3)	3.52 (4)	3.45 (2)	3.28 (1)	4 (more than 2 hours)	.66	.66
PARENT ATTITUDE Wilks F = 1.04 p = .167	25) Parent Attitude Scale: Total	.468	105.63 (1)	98.23 (3)	98.01 (4)	96.35 (2)	128	16.61	253.55
	26) Reactions to Outside Help	.440	22.81 (1)	21.84 (4)	21.06 (2)	20.44 (3)	28	4.83	20.33
	27) Anxiety/Guilt	.402	23.02 (1)	22.91 (4)	21.37 (2)	21.22 (3)	28	4.26	17.15
	28) Acceptance	.319	59.75 (1)	56.58 (3)	53.81 (2)	53.29 (4)	72	9.43	83.39
PSYCHO-SOCIAL BEHAVIORS Wilks F = 1.41, p = .122	29) Meadow-Kendall: Social Adjustment	.031*	75.58 (1)	66.67 (2)	65.65 (3)	62.97 (4)	92	13.37	124.49
	30) Self-Image	.135*	71.74 (1)	63.93 (3)	66.25 (2)	62.99 (4)	92	11.83	106.80
	31) Emotional Adjustment	.313	44.36 (1)	42.88 (2)	40.97 (3)	39.66 (4)	52	7.53	44.44
	32) Time Spent Reading	.409	2.17 (2)	2.07 (4)	2.05 (3)	1.67 (1)	4 (more than 2 hours)	.83	.73
	33) Solitary Play	.223	41.92 (4)	28.85 (2)	28.12 (3)	13.23 (1)	100% (solitary play vs. group play	27.37	699.69
	34) Number of Friends	.265	8.48 (4)	6.46 (1)	5.05 (3)	2.21 (2)	Unlimited	7.91	63.42
	35) Attitude Towards School	.696	1.42 (2)	1.31 (3)	1.30 (4)	1.22 (1)	3 (worse than most)	.49	.21
	36) Rating of Child's Behavior	.093*	2.46 (1)	2.19 (3)	2.11 (4)	1.91 (2)	3 (better than average)	.57	.32

[a] Unlimited but sentence length of 12 considered very long for child of this age.

groups, statistically significant group differences exist for three of the four dependent variable categories. These dependent variable category differences confirm the existence of overall group mean differences and the fact that individual dependent variable differences exist within a category.

Analyses of Specific Group Mean Differences

Multiple comparison procedures. In order to determine which specific group mean differences contributed to the overall group mean differences, multiple t-tests were performed on all pair-wise contrasts, and planned orthogonal contrasts were performed on group combination contrasts. Results of these analyses are in Table 4.5 on the next page. All *f* and *t* values that are statistically significant at $\alpha = .1$ level are noted with asterisks. Negative t-values for variables 18-21 indicate better performance for the first group in the pair-wise comparison since higher scores on these variables are indicative of poorer performance. Negative values for any other t-scores indicate better performance by the second group in the pair-wise contrast.

Discussion. Eighty percent of all *f* and *t* values favor groups 1 and/or 2 when compared to groups 3 and/or 4 at levels of statistical significance. This can be seen more specifically in a summary of the percent of *f* and *t* values that favor the home intervention children in groups 1 and/or 2.

Table 4.6

Percent of *f* and *t* Values Favoring Groups 1 and/or 2

Comparisons	% of statistically significant *f* and *t* values favoring groups 1 and/or 2	% of all *f* and *t* values favoring groups 1 and/or 2
1 vs. 4	100%	100%
1 and 2 vs. 4	95%	100%
1 and 2 vs. 3 and 4	92%	100%
1 and 2 vs. 3	79%	100%
2 vs. 4	75%	96%
1 vs. 3	71%	100%
2 vs. 3	46%	92%

Table 4.5

Results of Multiple Comparison Procedures

Dependent Variables	Multiple - T Tests: (critical $\underline{t}$ = 1.68)						Planned Orthogonal Contrasts: (critical $\underline{F}$ = 2.77)		
	Group 1 vs. 2	Group 1 vs. 3	Group 1 vs. 4	Group 2 vs. 3	Group 2 vs. 4	Group 3 vs. 4	Group 1 & 2 vs. 3 & 4	Group 1 & 2 vs. 3	Group 1 & 2 vs. 4
1) Woodcock-Johnson: Letter/Word identification	.06	2.95*	3.56*	2.90*	3.50*	.60	21.24*	17.46*	25.29*
2) Woodcock-Johnson: Word attack	-1.39	1.52	3.59*	2.91*	4.99*	2.07*	21.50*	9.90*	37.39*
3) Woodcock-Johnson: Passage comprehension	-1.19	.49	2.20*	1.68*	3.38*	1.71*	7.70*	2.41	15.90*
4) Woodcock-Johnson: Calculation	-.46	4.14*	5.61*	4.6*	6.07*	1.47	53.55*	39.24*	70.08*
5) Woodcock-Johnson: Applied problems	.94	2.35*	3.36*	1.40	2.42*	1.02	11.54*	7.14*	16.99*
6) Woodcock-Johnson: Dictation	-.99	1.26	2.17*	2.25*	3.16*	.91	10.03*	6.34*	14.57*
7) Woodcock-Johnson: Proofing	-.16	1.24	2.93*	1.40	3.09*	1.68*	9.66*	3.61*	18.61*
8) Peabody Picture Vocabulary Test: Raw score	1.59	2.75*	2.54*	1.16	.95	-.22	7.00*	7.85*	6.19*
9) Peabody Picture Vocabulary Test: Standard score equivalent	1.41	2.83*	3.07*	1.42	1.68*	.25	10.33*	9.23*	11.49*
10) Peabody Picture Vocabulary Test: Mental age	.96	2.57*	2.54*	1.61	1.58	-.03	8.81*	8.93*	8.69*
11) TACL	.84	2.31*	2.60*	1.47	1.83*	.29	8.79*	7.31*	10.40*
12) EOWPVT	-.44	2.76*	2.55*	3.20*	2.90*	-.22	16.09*	18.19*	15.63*
13) Arizona: Raw	.18	1.33	3.91*	1.15	3.76*	2.61*	13.23*	3.14*	30.29*
14) Communication Inventory	1.88*	1.52	3.91*	-.36	2.02*	2.39*	6.41*	.68	17.96*
15) Teacher Rating of Communication Skills	1.75*	1.82*	3.29*	.07	1.54	1.46	5.71*	1.82	11.78*
16) CCS - Raw	2.36*	3.26*	4.70*	.92	2.36*	1.43	16.02*	8.92*	25.19*
17) Time Hearing Aid Worn	-.59	3.36*	5.91*	3.95*	6.5*	2.55*	47.76*	26.29*	75.59*
18) % Child Communication Understood by Family	-.96	-1.77*	-3.91*	-1.82*	-2.95*	-2.14*	10.97*	3.30*	23.12*
19) % Child Communication Understood by Non-Family	-1.29	-3.07*	-5.14*	-1.79*	-3.86*	-2.07*	24.33*	11.96*	41.05*
20) % Child Understands Family	-.72	-2.44*	-2.48*	-1.72*	-1.76*	-.04	8.88*	8.72*	9.06*
21) % Child Understands Non-Family	-1.58	-4.21*	-4.24*	-2.64*	-2.67*	-.03	23.87*	23.66*	24.08*
22) Rating of Child Behavior	3.24*	1.59	2.06*	-1.66	-1.18	.47	.09	.002	.41
23) Meadow-Kendall - Social Adjustment	2.71*	3.02*	3.83*	.31	1.12	.81	8.78*	5.67*	12.57*
24) Meadow-Kendall - Self-Image	2.56*	1.80*	2.87*	-.76	.31	1.07	2.28	.47	4.44*

These results indicate that the hearing impaired children in this study who received home intervention perform better on the majority of dependent variables than children who did not receive home intervention.

When performing multiple comparison procedures on group 1 vs. 2 (early vs. late) and group 3 vs. 4 (no home intervention/preschool vs. no home intervention/no preschool), the majority of *t*-values were not statistically significant. This indicates that early vs. late and preschool vs. no preschool effects are largely nondifferential for children in this study.

When considering the percent of statistically significant group differences in dependent variable categories, *early* intervention children perform better on communication/language skills while late intervention children performed better on achievement tests. This may suggest that early home intervention more directly affects later language.

Analyses of Educational Significance

Effect size analysis. In order to determine the existence of educationally significant differences of specific group means, effect sizes were obtained for all comparisons discussed in the previous section. These results are shown below in Table 4.7. Effect sizes of larger than .5 are considered to be important from an educational standpoint and are noted with asterisks.

It should be noted that effect sizes for all 36 dependent variables are given below since even though statistically significant overall group differences do not exist for 12 of these dependent variables, there is still possibility for there to be educationally significant group differences for these variables (and vice versa).

Table 4.7

Effect Sizes for Research Group Comparisons

Dependent Variables	1 vs. 2	3 vs. 4	1 vs. 3	2 vs. 3	1 vs. 4	2 vs. 4	1 & 2 vs. 3	1 & 2 vs. 3 & 4	1 & 2 vs. 4
Variables that are statistically significantly different among groups:									
1) Woodcock-Johnson: Letter/Word Identification	.01	.14	.68*	.67*	.82*	.81*	.67*	.74*	.81*
2) Woodcock-Johnson: Word Attack	-.32	.48	.35	.67*	.83*	1.15*	.51*	.75*	.99*
3) Woodcock-Johnson: Passage Comprehension	-.26	.38	.11	.37	.49	.75*	.24	.43	.62*
4) Woodcock-Johnson: Calculation	-.08	.26	.74*	.82*	1.00*	1.09*	.70*	.91*	1.05*
5) Woodcock-Johnson: Applied Problems	.22	.23	.54*	.25	.77*	.55*	.43	.54*	.66*
6) Woodcock-Johnson: Dictation	-.23	.21	.30	.53*	.51*	.75*	.41	.52*	.63*
7) Woodcock-Johnson: Proofing	-.04	.40	.29	.33	.69*	.73*	.31	.51*	.71*
8) Peabody Picture Vocabulary Test: Raw Score	.39	-.05	.68*	.29	.62*	.23	.48	.45	.43
9) Peabody Picture Vocabulary Test: Standard Score Equivalent	.35	.06	.70*	.35	.76*	.41	.53*	.56*	.59*
10) Peabody Picture Vocabulary Test: Mental Age	.23	-.01	.63*	.39	.62*	.39	.51*	.51*	.51*
11) TACL	.20	.08	.54*	.34	.62*	.43	.44	.48	.52*
12) EOWPVT	-.10	-.06	.64*	.74*	.59*	.69*	.69*	.66*	.64*
13) Arizona: Raw	.04	.51*	.26	.23	.78*	.74*	.24	.50*	.71*
14) Communication Inventory	.45	.57*	.36	-.09	.93*	.48	.14	.42	.64*
15) Teacher Rating of Communication Skills	.46	.38	.48	.02	.86*	.40	.25	.44	.76*
16) DSS - Raw	.50*	.35	.80*	.23	1.16*	.50*	.52*	.69*	.87*
17) Time Hearing Aid Worn	-.13	.56*	.74*	.87*	1.30*	1.43*	.81*	1.09*	1.32*
18) % Communication Understood by Family	-.22	-.50*	-.41	-.19	-.91*	-.69*	-.30	-.55*	-.80*
19) % Communication Understood by Non-Family	-.31	-.50*	-.74*	-.43	-1.23*	-.92*	-.58*	-.83*	-1.00*
20) % Child Understands Family	-.20	-.01	-.66*	-.47	-.67*	-.48	-.57*	-.50*	-.58*
21) % Child Understands Non-Family	-.41	-.01	-1.10*	-.60*	-1.11*	-.70*	-.90*	-.90*	-.90*
22) Rating of Child Behavior	.96*	.14	.47	-.49	.61*	-.35	0	.07	.61*
23) Meadow-Kendall - Social	.67*	.20	.74*	.08	.94*	.28	.41	.51*	.41
24) Meadow-Kendall - Self-Image	.66*	.28	.46	-.20	.74*	.08	.13	.27	.14
Variables that are not statistically significantly different among groups:									
25) Arizona: Consonant Error	.11	-.40	.06	-.06	-.34	-.46	0	-.20	-.40
26) DSS: MLU	-.19	-.24	.24	.42	-.01	.18	.33	.21	.09
27) Parent Attitude: Total	.56*	.01	.45	-.11	.46	-.10	.17	.17	.18
28) Parent Attitude: Reactions to Outside Help	.36	-.29	.49	.13	.20	-.16	.31	.16	.02
29) Parent Attitude: Anxiety/Guilt	.39	-.40	.42	.04	.03	-.35	.23	.03	-.17
30) Parent Attitude: Acceptance	.63*	.35	.34	-.29	.69*	.06	.02	.20	.37
31) Meadow Kendall: Emotional Adjustment	.20	.17	.45	.25	.62*	.43	.35	.44	.53*
32) Time Spent Reading	-.60*	-.02	-.46	.14	-.48	.12	-.16	-.17	-.18
33) Solitary vs. Group Play	-.57*	-.50*	-.54*	.03	-1.05*	-.48	-.26	-.51*	-.78*
34) Number of Friends	.54*	-.43	.18	-.36	-.26	-.79*	-.09	-.31	-.52*
35) Attitude Towards School	-.41	.02	-.18	.22	-.16	.24	.02	.02	.04
36) Time % Communication	-.20	.03	-.31	-.12	-.28	-.00	-.21	-.20	-.17

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For variables 18-21, 33, and 35, negative effect sizes still indicate better performance by the first group in the comparison since higher scores on these variables are indicative of poorer performance.

Discussion. When considering the number of educationally significant effect sizes compared to statistically significant f and t values, it is apparent that there are more statistically significant f and t values for the 24 dependent variables that show statistically significant overall group differences. However, educationally significant effect sizes exist for the majority of the 24 dependent variables in the majority of group comparisons. These observations are summarized below in Table 4.8.

Table 4.8

Number of Statistically Significant f and t Values vs. Educationally Significant ES Values

Comparisons	No. of statistically significant f or t values	No. of educationally significant ES values
Group 1 vs. 2	6 (t)	4
Group 3 vs. 4	8 (t)	4
Group 1 and 2 vs. 3	19 (f)	11
Group 1 and 2 vs. 3 and 4	22 (f)	17
Group 1 and 2 vs. 4	23 (f)	21
Group 1 vs. 3	17 (t)	14
Group 2 vs. 3	11 (t)	7
Group 1 vs. 4	24 (t)	23
Group 2 vs. 4	18 (t)	14

There are more educationally significant differences for dependent variables that were previously determined to be statistically significantly different among groups than for those dependent variables that were not. For those dependent variables that were previously determined not to be statistically significantly different among groups, 14% (15 out of 108) of the effect sizes are educationally significant. Twelve of these 15 effect sizes favor the following groups: home intervention over no home intervention, early over late home intervention, and preschool over no preschool.

Comparisons that were previously determined to be statistically significantly different among groups consistently favor the first group in the comparison at a level of educational significance. In the 1 vs. 4, 1 vs. 3, 2 vs. 4, 1 and 2 vs. 4, and 1 and 2 vs. 3 and 4 comparisons, the majority of the effect sizes favor the children in home intervention groups.

Home intervention children are again favored in the group 1 and 2 vs. 3 contrast, where all groups are equated on preschool. The positive long-term effects of home intervention vs. no home intervention on hearing impaired children are suggested in these results.

Implications and Recommendations For Future Research

In this section, research findings will be presented, and then implications of each finding will be listed. In a statistical sense, these implications are true only to the extent that external validity exists in the study. Measures taken to control threats to external validity were outlined in Table 4.1.

Finding

Hearing impaired children in this study who receive home intervention earlier in their lives performed better than children who did not receive home intervention on the majority of dependent variables in the areas of language, academic achievement, and psycho-social behavior.

Implications

1. Home intervention promotes the development of basic skills that enhance later language, academic, and psycho-social functioning.

Hearing impaired children who receive home intervention services may be able to function better at home and at school than children who do not receive home intervention services. Home intervention children may be better able to interact with family, peers, and teachers as evidenced by their superior communication and psycho-social competencies. They may also be able to function better academically in school since academic achievement skills are improved.

2. Parents and siblings who receive home intervention are apparently able to communicate more effectively with the hearing impaired child than parents and siblings who do not receive home intervention, since the child's communication and interactive skills are improved.
3. Teachers and professionals who deal with home intervention children may also be able to more effectively interact with these children because of improved communication, academic, and psycho-social skills.

   In addition, they may spend more time on the promotion of subject matter skills instead of language-related skills (contrary to the typical educational programming of hearing impaired children who enter school without strong language bases). Also, teacher time spent on management of hearing aid, management of problem behavior, and explanation of school tasks and protocol may be reduced with home intervention children.

Finding

Children in this study who received early home intervention performed better than late intervention children on some of the dependent variables. Early intervention children performed better on communication/language skills in relationship to academic skills.

Implications

1. The success of home intervention is dependent on many factors, including timing, duration, and intensity of intervention efforts.

Finding

Hearing impaired children in this study who received preschool, but not home intervention services performed better than children who did not receive preschool or home intervention on certain dependent variables.

Implications

1. The impact of home intervention may be strengthened by the provision of other services, such as preschool. The provision of home intervention and preschool may result in greater communication, academic, and psycho-social benefits for the child than the provision of either service (especially preschool) alone.

Finding

Many factors, particularly child and parent characteristics, account for the majority of the variance of the dependent variables if not controlled in the analyses.

Implications

1. Effectiveness of home intervention is dependent on many factors. In this study, it was determined that some of the most important factors contributing to the long-term effect of home intervention were: Child age, hearing loss, parental index of social position, existence and severity of other handicaps, age of mother, and number of middle ear infections. Of course, there are others. Since it was not

within the scope of this research project to specifically study what and how child and parent characteristics contribute to later success, a complete description of their effects is not possible.

However, from this study and others (Gage & Berliner, 1979), one important implication that emerges is the necessity of optimizing factors that might contribute to later child success, such as (a) reducing middle ear ear infections, (b) mitigating effects of other handicaps, (c) improving SES, (d) improving such parental characteristics as time interacting with child, aspiration for child achievement, emphasis of language development, provision of learning opportunities in the home, and acceptance of the child. It should be noted that the long-term impact of home intervention may be dependent on the nature of the intervention. The SKI*HI model (which directly habilitates communication in the hearing impaired child) may have more direct effects on later language than academic skills. Or perhaps the nature of any home intervention program is such that impact will be greater on later language vs. academic skills since many skills requiring habilitation are age specific (language skills precede academic skills). In either case, the nature of the intervention may have an effect on later child performance.

Finding

Many dependent variables did not reveal statistically significant differences between research groups.

Implications

1. It is impossible to determine with precision why group difference did not exist for a few of the dependent variables. However, some possible reasons for the no-difference findings are:

a. Problems with validity and reliability could have existed for measures used in this study, particularly the parent attitude scale, some items in the parent questionnaire, and the DSS-MLU.

b. Intervention could have provided effective services during its tenure but could not completely buffer families from the adverse effects of hearing impairment during later periods of developmental crisis.

c. The advances made by intervention children during treatment could have been reduced or reversed when these children were later grouped in schools with no intervention children.

Whatever the reasons for no difference, it becomes apparent that further research is needed to see if some dependent variable differences really do not exist and, if so, for what reasons, and to develop intervention strategies that more successfully remediates the dependent variable skills.

While this study has resulted in some useful findings in regards to the long-term effects of intervention on hearing impaired children, much research remains to be done:

1. Continued longitudinal data collection on the intervention children involved in this study are needed.
2. Studies are needed on the impact of home intervention on child and parent competencies not included in this study.
3. Studies are also needed on the impact of home intervention on areas other than child and parent competencies, such as sibling attitudes, family/marital structures, extended family involvement, and community awareness.
4. Further studies are needed to replicate the Clark and Covert (1979) study on short-term effects of home intervention and the effect of

vs. late home intervention on hearing impaired children.

5. Cost effectiveness studies are needed which would involve:
    a. identification of all treatment alternatives,
    b. description of all components necessary for administration of treatment alternatives,
    c. assignment of cost values to all resources,
    d. analysis of cost outlay in terms of child and parent progress.
6. Studies need to be done isolating parent, child, and environmental factors that are highly related to later child success and that are remediable, such as parent-child interactive styles, parent motivation and aspiration for child's achievement, home environments arranged for learning, parent encouragement of child's autonomy, and parent acceptance of the handicapped child.

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CHAPTER V

DISSEMINATION

As part of the EIRI proposal, a dissemination plan was developed and summarized in the proposal. This plan included 11 major components. The dissemination plan is reproduced on the next page as Table 5.1. From the table, a description of dissemination activities in each area is given.

Activity One - Utilizing the University affiliated network

The Institute has utilized this network infrequently during Year #1. Contacts have been made with the network but EIRI staff have mostly repsonded to information requests. As research findings accumulate, this network will be utilized more extensively as a dissemination outlet.

Activity Two - Utilizing existing training
activities of the Exceptional Child Center

The Institute has utilized the existing training activities extensively as a dissemination vehicle. EIRI staff have made presentations to training groups and have conducted meta-analysis and cost-effectiveness workshops for these training groups.

Activity Three - Publications

A total of 23 publications, conference presentations and workshops were disseminated during Year #1. Eighteen other publications and papers are in preparation. A complete list of these efforts appears as Table 5.2. It should be noted that there is some duplication of papers in certain areas. Those titles listed under "submitted for review" are currently being reviewed by members of the EIRI publications review council.

Table 5.1

Summary of EIRI Dissemination Plan

Activity	Description
1. Capabilities of ECC as one of the nationwide networks of University Affiliated Programs for the Developmentally Disabled	The ECC is one of a network of 47 University Affiliated Facilities (UAFs) throughout the United States. One of the primary missions of UAFs is the dissemination of information about providing effective services to handicapped people. Consequently, ECC staff are already heavily involved in numerous organizations and activities which will contribute to the dissemination of information from the EIRI. For example, ECC staff have regular contact and/or serve on Councils for the Developmentally Disabled in Utah, Idaho and Wyoming; the ECC has sponsored and continues to provide support services to two satellite UAFs in Montana and on the Navajo reservation in Arizona; the ECC board of directors includes representation from the Utah Division of Health, local school districts, related University departments, and parents; the ECC advisory board includes people from a five state area who are associated with the provision of services to handicapped individuals; and, copies of the ECC Annual Report are distributed to over 150 people throughout the United States. In all of these contacts, information about the EIRI, its findings and products, would be disseminated without any cost to the EIRI.
2. Existing ECC training activities separate from EIRI	A second primary thrust of the Exceptional Child Center is training of people responsible for providing services to handicapped individuals. These training activities include both preservice and inservice in a wide variety of areas. During 1980-81 ECC staff provided 3248 student credit hours of University coursework and practica, 47 workshops involving 8984 person contact hours and spent 1773 days in various field activities throughout the Western United States. Virtually all of these training activities also serve a dissemination function, many of which are directly relevant to the provision of services to young handicapped children. Findings and products from the EIRI can be disseminated through these training activities with no cost to EIRI. Specific examples of the types of projects applicable for such dissemination can be seen in the Technical Section of the ECC 80-81 Annual Report in Appendix E.
3. Publications	Findings and information about products developed by the EIRI will be disseminated through a variety of professional outlets. Each research thrust will generate one or more articles to be submitted to professional refereed journals; all applicable products, technical reports, and research summaries will be filed with ERIC; reports of major research thrusts will be prepared as publications as books, and information about EIRI and its findings will be released to various professional and parent newsletters. Two of these newsletters are published by the Exceptional Child Center: the Exceptional News (a newsletter for providers with circulation of 2,200) and the Parent Newsletter (a newsletter for parents of handicapped children with a circulation of 700) will regularly carry information about the activities of EIRI. Officials of the Special Educator, a newsletter published by the Utah Comprehensive System of Personnel Development consortium and distributed to all special education teachers in Utah, have also agreed to carry a regular quarterly column from EIRI (see letter of support). Other outlets such as the National Association for Retarded Citizens, the Technical Assistance Development System (TADS) Newsletter and other state newsletters will also be approached about dissemination opportunities.
4. Conference presentations and information displays	EIRI findings and information about products will be disseminated regularly through professional conferences and meeting information about products will regularly be disseminated through professional conferences and meetings. During the first year (1982-83) no formal papers will be presented at such national meetings because of deadlines for submission. However, the ECC regularly displays products and information at such conventions. During 1982-83, the Institute will do two such exhibits, one at CEC's annual meeting in Dallas and the second at the AAMD annual meeting in Detroit. Displays will distribute information about the mission, activities, and findings of EIRI. In subsequent years of the Institute, numerous professional presentations will be made. The Institute will fund travel and per diem for four people to conventions each year, but many more presentations will be made with travel costs being covered by other ECC funds. For example, during the last two years members of the proposed EIRI management team have averaged 7.3 professional presentations per year at national meetings. Graduate students and research assistants will also participate in these presentations.

Table 5.1 (continued)

Activity	Description
5. Presessions in conjunction with professional meetings	Beginning in year #2 of the Institute, at least one research training pressesion will be held in conjunction with a national professional meeting such as AERA, CEC, or AAMD. All of the senior level staff on the Institute have experience conducting such presessions at either AERA, CEC, or AAMD. Such presessions provide opportunity for in-depth training of national audiences.
6. Summer conferences and workshops at Utah State University	Each year for the past five years Utah State University's Department of Special Education in conjunction with the Exceptional Child Center has sponsored a Special Education Interventions Conference, which is attended by approximately 100 people from throughout the western United States. The Head of the Department of Special Education has agreed to have at least one session of this Interventions Conference sponsored by EIRI each year (see letter of support). Costs for major recruitment and publicity for this conference would not be charged to the EIRI budget. In addition, Utah State University's Lifespan Learning Center, a division of Continuing Education, sponsors numerous workshops each summer on a variety of topics. The head of Continuing Education has also agreed to have EIRI participate in this program (see letter of support). The facilities of the recently completed Lifespan Learning Complex and Residence Hall on the campus of Utah State University provide particularly attractive facilities for such conferences.
7. Training Sessions in conjunction with research projects	As noted earlier, intensive training will be provided to project staff in meta-analysis and cost effectiveness analysis during year one. Participation in these workshops will be opened up to other interested people at the University and throughout the state and region for the cost of materials (and tuition should they desire credit). It is anticipated at least 15 additional people outside the staff will attend both of these workshops.
8. Newspaper and television coverage	Regional newspaper and television stations routinely cover significant activities of the Exceptional Child Center (for example, a recent article concerning the Multiagency Program for Preschoolers (MAPPS), an early intervention program developed at the ECC, is contained in Appendix E). Staff from the EIRI will work with USU public information specialists to actively seek out this type of information coverage.
9. Placement of trainees	Some of the most effective and long-term dissemination of Institute findings and products will occur through the placement of graduate students and research assistants trained by the Institute. The Exceptional Child Center has already established an excellent track record in this area. A number of students who have participated in the interdisciplinary training program of the Exceptional Child Center are working in areas directly related to the provision of services to preschool handicapped children. Emphasis on the person's interest in working with preschool children will be used in recruiting graduate and research assistants, so it is anticipated that this excellent track record will be even better for students trained in conjunction with EIRI.
10. Annual distribution of key findings and products	As a part of its dissemination efforts, the EIRI will develop a brief executive summary of its activities and accomplishments for each year, including a listing of publications, products, and technical reports which will be disseminated free of charge to a broad audience of people and organizations interested in early intervention with handicapped children (approximately 200 people). This distribution list will be compiled by identifying one person in each state (either education, social services, or health) who is in a key position relative to the provision of early intervention services in that state, and asking each to nominate one other person in their state who ought to be included. HCEEP project directors and former project directors and university based researchers with demonstrated interest in the area will also be included.
11. Attendance at semiannual Institute meetings	At least two people from EIRI staff will attend the semiannual institute meetings in Washington, D.C. and participate fully in its proceedings.

Activity Four - Conference presentations and information displays

The EIRI staff delivered 14 conference presentations during Year #1. These papers and presentations appeared in Table 5.2. Information displays were prepared for the DEC/HCEEP conference.

Activity Five - Pre-sessions at professional meetings

EIRI staff conducted three pre-sessions at professional conferences. These pre-sessions encompassed meta-analysis training and cost-effectiveness training. Titles of the sessions were given in Table 5.2.

Activity Six - Summer conferences and workshops

EIRI staff conducted a workshop as part of the Utah State University summer session. The workshop provided interested practitioner researchers with information concerning institute activities. Twenty people from a four state area were included in the workshop.

Activity Seven - Training sessions in conjunction with ongoing research

The Institute conducted both meta-analysis and cost-effectiveness training workshops for Institute staff and interested practitioners and researchers from the intermountain area.

Activity Eight - Newspaper and television coverage

Announcements concerning the Institute and its work scope appeared in area media during the year. One regional television station reported EIRI activities. This dissemination activity will assume a higher priority as institute findings become available.

Activity Nine - Placement of trainees

Trainees working with EIRI during Year #1 have been placed in Texas, Idaho and Maryland. These placements will increase as trainees finish degree programs.

Table 5.2

EARLY INTERVENTION RESEARCH INSTITUTE

Publications, Professional Papers and Presentations

Publications

Casto, G., White, K., & Taylor, C. An early intervention research institute: Studies of the efficacy and cost effectiveness of early intervention at Utah State. *Journal of the Division for Early Childhood*, 1983, *7*, 5-17.

Submitted for Review

Bush, D., & White, K. The effectiveness of early intervention: A summary of previous reviewers' conclusions.

Casto, G., & Clarkson, D. Selecting outcome measures in early intervention.

Casto, G., Shearer, D., & Cavaleri, T. Critical issues in early intervention: A view from the field.

Mills, T., Shearer, D., & Casto, G. Research into practice: Procedures for the effective dissemination of research findings.

In Preparation

1. A cost-effectiveness study of half-day versus full-day preschool programs for the handicapped.
2. Policy implications of a cost-effectiveness analysis of half-day versus full-day preschool programs for the handicapped.
3. A critical review of cost-effectiveness analysis in the provision of human services.
4. The costs of preschool education for the handicapped.
5. Conducting cost-effectiveness analyses in special education (addressed to practitioners).
6. Conducting cost-effectiveness analyses in special education (addressed to researchers).
7. A critique of an economic analysis of the Ypsilanti Perry Preschool Project.
8. Valuing parent contributions in preschool programs for the handicapped.
9. A manual for conducting cost-effectiveness studies in special education.
10. A critique of the Colorado cost-effectiveness study: Effectiveness of early special education for handicapped children.

In Preparation (continued)

11. A meta-analysis of the early intervention research literature (monograph length).
12. A meta-analysis of the early intervention research literature (journal article--researchers).
13. A meta-analysis of the early intervention research literature (journal article--practitioners).
14. Conclusions from an analysis of previous reviews of early intervention.
15. Conducting high quality integrative reviews.
16. A critical analysis of the Milwaukee Project.
17. Early versus late preschool intervention for hearing impaired children.
18. The effectiveness of home-based and center-based intervention programs for preschool hearing impaired children.

Professional Papers and Presentations

Bush, D. W., & White, K. R. *The efficacy of early intervention: What can be learned from previous reviews of the literature?* Paper presented at the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

Casto, G. *The efficacy of early intervention: Conclusions from previous reviews of the literature.* Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

Casto, G., & Casto, Y. *Intervening with high risk infants.* Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

Casto, G., & Clarkson, D. *Selecting outcome measures in early intervention.* Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

Casto, G., & Shearer, D. *Previous reviewers' conclusions about the effectiveness of early intervention.* Paper presented at the Montana Symposium for Severe/Profound, Billings, Montana, February 1983.

Casto, G., Shearer, D., & Cavaleri, T. *Critical issues in early intervention: A view from the field.* Paper presented at the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983 and the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

Table 5.2 (continued)

Professional Papers and Presentations (continued)

Mills, T., Shearer, D., & Casto, G. Research into practice: Procedures for the effective dissemination of research findings. Paper presented at the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

Pezzino, J., & Taylor, C. A critical review: Cost-effectiveness analysis in human service research. Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983 and the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

Shearer, D. Early Intervention Research Institute. Presented to Research in Action II, Lubbock, Texas, February 1983.

Taylor, C., & Pezzino, J. How to analyze the cost-effectiveness of preschool programs. Invited presentation to Board of Directors, Northwest Child Development Center, Wyoming, April 1983.

Walker, K. How to value parent time: A cost or a benefit? Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

Walker, K. Making dollars and sense of cost-effectiveness procedures. Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

White, K., & Casto, G. The integration of completed research: Procedures and state of the art. Paper presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983.

White, K. R., Goodrich, G., & Taylor, C. The integration of completed research: Standards for high quality work. A paper presented at the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

Workshops

Taylor, C., Pezzino, J., Walker, K., & Cavaleri, T. Cost effectiveness analysis in social program evaluation. Worksnop presented at the Fourth Annual Montana Symposium on Early Education and the Exceptional Child, Billings, Montana, April 1983 and the Annual Meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

Taylor, C. Cost-effectiveness analysis of early intervention. Presented at the Early Intervention Research Institute's Summer Workshop, "Efficacy and Cost Analysis in Early Intervention: Research Into Practice", Logan, Utah, June 1983.

Workshops (continued)

White, K. R., & Bush, D. W. Meta-analysis procedures for integrating research. Workshop presented at the annual meeting of the Rocky Mountain Psychological Association, Snowbird, Utah, April 1983.

White, K. R. Meta-analysis: Integrating completed research. Presented at the Early Intervention Research Institute's Workshop, "Efficacy and Cost Analysis in Early Intervention: Research Into Practice", Logan, Utah, June 1983.

Activity Ten - Annual distribution of key findings

An executive summary of Year #1 findings is currently being prepared. The summary will be distributed extensively utilizing the EIRI dissemination file. Copies of the annual report will also be made available to a more restricted audience. Technical papers will be published in early education journals.

Activity Eleven - Attendance at semi-annual meetings

The three primary staff members of the Institute have participated in both meetings conducted to date.

CHAPTER VI

ADVISORY COMMITTEE

Advisory groups represent a substantial investment. To enhance the value of the advisory functions, the Utah State University Early Intervention Research Institute proposed an advisory group configuration which was unusual in terms of selection and function. The primary ways in which the EIRI Advisory Committee differs from typical advisory committees are outlined below.

1. The main advisory committee consists of 10 people--six who are primarily methodologists and/or early intervention content experts; and four who primarily represent constituency groups. To select people representing various constituency groups, national organizations were contacted and asked for a nominee for the advisory committee. This selection procedure provided a more direct link in disseminating information to constituent groups and should result in advisory committee members being more sensitive to the views and concerns of the groups they represent.
2. Structured assignments with clearly defined outcomes were given to each member of the advisory committee to ensure that they would give effective feedback about the Institute's direction.
3. A second group of approximately 50 people were identified to serve as "field reviewers". These people will not attend advisory committee meetings but have agreed to respond to written questionnaires concerning various EIRI functions. This feedback provides broad input from the field at nominal cost. This group responded to three questionnaires during the year.

The two advisory groups referred to above were structured to assist EIRI in three main areas.

1. Assure that the Institute remains responsive to the priority needs and concerns of the field; and that activities and procedures are sensitive to current issues, politics, and organizational arrangements.
2. Provide structured review and criticism of EIRI plans and products to assist with quality control and methodological rigor.
3. Assist in disseminating information concerning EIRI activities, findings, and products; and provide advice and criticism concerning dissemination options.

Descriptions of the organization and tasks of the main advisory committee and the field reviewers during Year #1 are given below.

Composition of Advisory Committee

Table 6.1 provides a description of Advisory Committee members along with a brief summary of their experience and qualifications.

The Year #1 advisory committee meeting was held on October 20 and 21, 1982. The meeting was held early in the year to enable project personnel to receive feedback early in the project on the proposed Year #1 work scope. The agenda for the first meeting is reproduced on the following page.

EARLY INTERVENTION RESEARCH INSTITUTE

ADVISORY COMMITTEE MEETING AGENDA

October 20 & 21, 1982

Wednesday - October 20

12:00 - 1:30 pm	Lunch Introduction of EIRI Staff and Advisory Committee
1:30 pm - 2:15 pm	Tour of Exceptional Child Center Facilities and Programs
2:15 pm - 3:00 pm	Brief Overview of Early Intervention Projects Associated with EIRI (MAPPS, SKI*HI, Portage, CHIPP)
3:15 pm - 5:00 pm	General Work Session on Issues/Problems/ Improvements in Proposed Work Scope

Thursday - October 21

8:30 am - 12:00 Separate into Task Groups to Address Specific Issues

Program Design Task	Methodological Task Group
Merle Karnes	Gene Glass
Peter Fanning	Craig Ramey
Jessica Strout	Hank Levin
	Karl White
	Cie Taylor
Glendon Casto	Ann Austin
David Shearer	Susan Watkins

12:00 - 1:00 pm	Lunch
1:00 pm - 3:15 pm	Continuation of Task Group Work
3:15 pm - 3:30 pm	Break
3:30 pm - 4:30 pm	Presentation and Discussion of Issues from Task Groups which Need Comment Discussion by Entire Committee
4:30 pm - 5:00 pm	Procedures for Follow-up, Subsequent Activities Next Meeting and Specific Assignments

Table 6.1
Membership of EIRI Advisory Committee

Gene V Glass, Ph.D.	Professor of Education & Psychology and Co-director of Laboratory of Educational Research University of Colorado	Dr. Glass is one of the country's leading research methodologists and the originator of "meta-analysis" techniques. He has written or edited 9 books (including one of the most widely used statistics texts and a book on meta-analysis) and over 150 publications. He is a former president of the American Educational Research Association and has served as the editor of Review of Educational Research and Psychological Bulletin. He has served on numerous national advisory committees including the Technical Advisory Committee to the National Assessment of Educational Progress and one for conducting a meta-analysis of Bilingual Education. His research has addressed numerous problems in special education.
Henry Levin, Ph.D.	Professor of Economics and Education, and Director of the Institute for Research on Educational Finance and Governance, Stanford University	Dr. Levin is probably the country's foremost authority on cost effectiveness/cost benefit analysis in education. Applying his training as an economist to educational problems, he has written the seminal works on cost analysis in education. His publications include 11 books and over 100 articles. His recent publications include a manual for conducting cost analyses in education and several papers on cost analysis in special education. He is a past president of the Evaluation Research Society, a past vice president of AERA, and served on the National Advisory Committee for National Program on Early Childhood Education. He directed the Ford Foundation sponsored "An Economic Analysis of Educational Vouchers" from 1970-73 and has been principal investigator for over $5 million of projects from 1978-82.
Craig Ramey, Ph.D.	Professor of Psychology and Director of Research at the Frank Porter Graham Child Development Center, U. of North Carolina	Since 1975, Dr. Ramey has directed the Carolina Abecedarian Project and Project CARE--two projects assessing the longitudinal effect of early intervention with "high risk" and developmentally delayed children. He has been active with the Carolina Institute for Research and Early Education and has published over 75 articles on early intervention and developmental psychology.
Merle Karnes, Ph.D.	Professor of Education, Institute for Child Behavior and Development, University of Illinois	Dr. Karnes has directed numerous Early Intervention Projects with handicapped, gifted, and disadvantaged children, and is one of the leading authorities in curriculum for preschool children. She was author of the preschool curriculum, Small Wonder, and has over 100 publications on curriculum development and parental participation. Currently, Dr. Karnes is Editor of the Journal of the Division of Early Childhood (CEC). She has served on the Advisory Committee for two previous technical institutes and is currently serving on the advisory committee for the ACYF Head Start meta-analysis.
Peter Fanning	Director of Special Education, Colorado Department of Education	Mr. Fanning was nominated by the National Association of State Directors of Special Education. He is currently serving as the President of that organization. He has served as a classroom teacher for handicapped children (K-12) and a public school special education administrator.
Tal Black	Administrator	Tal Black is past President of the Division of Early Childhood (DEC), a division of the Council for Exceptional Children. He is also an associate director of the Technical Assistance Development System (TADS).
Sharon Hixon	Classroom Teacher	Sharon Hixon works with a preschool cooperative in the state of Kansas. She has been active in early intervention for several years.
Jessica Strout	Parent of a handicapped child	Ms. Strout was nominated by the National Association for Retarded Children. She is the parent of a handicapped child (age 4-1/2) who has been in intervention programs since age 1. She has been active in ARC and is currently chairperson of Friends of the Children's Center Board.
Phillip Strain	Director, Pittsburgh Early Intervention Research Institute	Dr. Strain directs the early intervention research institute located at the University of Pittsburgh. He has conducted numerous early intervention research projects and has published extensively in early intervention areas.
Rune Simeonsson	Investigator, Carolina Institute for Research on Early Intervention for the Handicapped	Mr. Simeonsson directs the FAMILIES research project at the University of North Carolina. He has written extensively in early intervention and is the author of the Carolina Record of Infant Behavior (CRIB).
Nina Carran	Administrator	Nina Carran is the director of a State Implementation grant (IOWA) which is forming a consortium of all state early childhood directors.

To receive feedback from advisory committee members in specific areas, a program design task group and a methodological task group were also constituted. These task groups and the tasks they addressed appear below.

ADVISORY COMMITTEE TASKS

Program Design Task Group
(Membership: Karnes, Fanning, Strout, Black)

Task/Questions	Relevant Sections of Proposal	Resources Which Will be Available at the Meeting
How can we improve strategies for identifying and collecting cost analysis data?	Pp. 38-40	List of possible ingredients and strategies.
How can we most effectively utilize field reviewers?	Pp. 56-58	List of field reviewers. Draft questionnaire.
How can we develop a field based research network for replication of EIRI studies and other studies generated by meta-analysis?	Pp. 1, 2, 23, 24, 25, 48-53	List of examples of agencies. List of suggested strategies.
How can we improve dissemination efforts? Should EIRI sponsor an annual Efficacy and Cost Analysis Conference?	Pp. 58-64	Dissemination plan.
How can we improve overall Institute plan for evaluation of operations and impact?	Pp. 68-36	Draft instruments.
How can we improve Institute Management and Time Tracking efforts?	Pp. 71-86	Draft instruments.

Methodological Issues Task Group
(Membership: Glass, Ramey, Levin, White, Taylor, Austin, Watkins)

Task/Questions	Relevant Sections of Proposal	Resources Which Will be Available at the Meeting
Develop matching strategies and select samples for cost study.	Pp. 30-44	Demographic characteristics of accessible population in Seattle.
Identify "effects" instrumentation for cost study including feasibility of administration, recruiting and training diagnosticians, whether battery is common for all handicapping conditions and if not, how to standardize scores for comparison across types of handicap within group	P. 41	Specimen sets of tests listed in proposal, review of tests from Buros or similar compendiums, information about availability of diagnosticians in Washington, outline of training procedures, reviews of other studies using same instrument.
Develop matching strategies and select samples for Hearing Impaired study.	Pp. 45-48	Demographic characteristics and degree of accessibility of potentially available populations for control group and experiment groups 1 and 2.
Identify instrumentation for longitudinal Hearing Impaired study including feasibility of administration recruiting and training diagnosticians, analysis issues relevant to selection of measures.	P. 47	Specimen sets of measures listed in proposal, summary of scoring procedures proposed for language, samples, reviews of tests from Buros or similar compendiums, outline of training and data collection procedures. (See note #1 above)
Review meta-analysis coding system/conventions (make sure important concomitant variables have not been left out and conventions are sufficient); procedures for collecting inter-rater consistency; and procedures and content for training sessions.	Pp. 13-29	Draft copies of: 1) coding system/conventions, 2) procedures for inter-rater consistency, and 3) content and outline of procedures for training session.
Discuss procedures for collecting cost data including ingredients accuracy of information, feasibility, and timing.	Pp. 30-33	Draft list of ingredients and suggested procedures.

During the two day meeting the members of the advisory committee made 30 major recommendations for consideration by EIRI staff. These recommendations are presented below followed by actions taken by EIRI staff.

1. In selecting the variables and specific measures to be used in the cost-effectiveness and longitudinal studies, it is important to develop a conceptual framework which describes the specific way in which we believe early intervention is functioning in these two settings. Craig Ramey described his approach to this task using General Systems Theory. He argued that a conceptual model such as this should be used to explain the intervention process and that instrumentation should then be based on that model. Such a model would provide a programmatic basis for future research and could also be used to rationally defend the outcomes we decide to measure and not to measure. Given limited resources and relatively small sample sizes, the model would also help to delimit the types of outcomes which were important enough to measure. It is not possible to measure everything, so it is critical to decide in what areas it is expected that intervention will have the biggest impact.

   Action Taken

   EIRI staff addressed this recommendation in two ways. A conceptual model based on systems theory was adopted. A paper detailing the Institute's approach to measuring outcomes was developed.

2. Although designs such as the longitudinal study and cost-effectiveness study are frequently conceptualized as analysis of

variance designs, there are major advantages in looking at multiple regression and path analytical analysis strategies. Such analysis strategies should be considered even though the small sample sizes in our first-year studies will make the application of such methodologies difficult (and consequently will require that we do a lot of front-end work on reducing the number of dependent variables and later perhaps using factor analytical or principal components analysis to further the set of outcomes).

Action Taken

It was not considered appropriate to use path analytic techniques during year one. Multiple regression techniques were utilized.

3. It would be worthwhile to develop a table showing (a) variable area to be measured, (b) instrument selected to measure that variable, (c) description of what the instrument measures and its psychometric properties, (d) the purpose of using that instrument in this particular study (i.e., how it relates to the conceptual framework described earlier), and (e) why that particular instrument was selected instead of other instruments.

   Action Taken

   A paper, "Selecting Outcome Measures in Early Intervention" was written. This paper provides a rationale for the selection of measures and contains an appendix which lists instruments according to the table suggested.

4. Some of the most interesting analyses in the longitudinal and cost-effectiveness studies will be the within-group analyses, e.g., why does the intervention work for some children but not for others, have mean levels been the only variable affected or have configural

relationships been affected, or do aptitude by treatment interactions exist.

Action Taken

These analyses were done for the cost effectiveness and longitudinal studies.

5. Wherever possible, use previously developed instruments. In a longitudinal project of the complexity we are undertaking, original instrument development is very difficult to do in addition to the tasks of data collection analysis and reporting. In addition, using existing instruments makes the research data more comparable with what exists in the literature.

   Action Taken

   The three research institutes are collaborating on common instrumentation efforts.

6. In conducting the meta-analysis, it is critical that we retain the capability of analyzing data to account for methodological weaknesses and other study and subject characteristics.

   Action Taken

   The capability to account for methodological weaknesses and other study and subject characteristics was built into the meta-analysis coding sheet.

7. It may be profitable to define effect size not only in terms of standardized mean differences between groups but also in terms of changes in variance and other distributional properties. A simple effect size measure of changes in variance would be the ratio of the variance of the control group to the variance of the experimental group. Where reported, it would be a simple matter to

also record measures of skewness and kurtosis which could be used later to construct similar effect size measures (although these will probably be reported infrequently).

Action Taken

A calculation of variance effect sizes was done for each study coded. The coding sheet also allowed us to document studies containing reports of median and adjacent scores.

8. It was suggested that in the early stages of the Institute, several papers on the methodology of conducting high-quality literature reviews would be beneficial to the field. A position paper on why particular variables were selected for examination in the meta-analysis (i.e., building on the analysis of previous reviews) or a paper on the methodology of conducting literature reviews would be good.

Action Taken

Papers on standards for conducting high quality reviews as well as a paper summarizing findings from previous reviews were completed.

9. A general principle to be followed in the meta-analysis should be to code information at the lowest level possible. For example, instead of just coding a total WISC score, we should code each of the individual subtest scores. Using the computer, scores can always be aggregated; but unless the specific information is recorded at this point, disaggregation will never be possible.

Action Taken

The Institute chose to compute effect sizes on total scores only. While the coding of subtest scores would result in larger numbers of effect sizes, they would not be as valid as total scores.

10. Regardless of the findings of the studies, the Institute will be in a politically controversial position. The topic area chosen is one about which everyone has a strong opinion; therefore, every report and article written will be heavily critiqued. The Institute will need to be sure that the quality of the work is above reproach and will need to establish quickly a reputation of doing high-quality scientific work. It may be possible to short-circuit some of the criticism which will surely come, by having results critiqued by recognized scholars before it is publicly disseminated. This will not only provide an opportunity to clarify and make corrections but will also mean that people criticizing the work will also have to criticize other established scholars.

    Action Taken

    The Institute staff remains committed to report its findings in an objective manner. Only those findings which are data based will be reported. Regardless of the findings, there will be controversy.

11. Carl Dunsford just completed a review on the efficacy of early intervention which will be appearing shortly in Evaluation Quarterly. We should get a copy of it.

    Action Taken

    A copy was procured.

12. In conducting the meta-analysis, we should not overlook the potential effects of early intervention on siblings and families

generally. Although more difficult to assess, the effects of early intervention on factors such as decreased divorce, mental health services, access to social services, and family stability are potentially valuable effects on the family.

Action Taken

These factors will be examined in succeeding years.

13. We should contact previous early childhood research institutes and get lists of all of the materials they produced during the last contract period. Some of these materials may be directly relevant to our efforts.

    Action Taken

    Copies of products produced by previous institutes were procured.

14. Tal Black noted that WESTAR and TADS had provided some assistance to projects in cost analysis. A follow-up memo to Tal asking him to summarize the types of assistance provided and the projects to whom it was provided would demonstrate to the field that we are interested in interagency collaboration, and might identify projects interested in cost-analysis issues that could be used later.

    Action Taken

    All cost analysis materials produced by TADS and WESTAR were collected and reviewed.

15. In identifying further articles for the meta-analysis, it might be wise to set up a computerized literature filing system so that one could pull out the names of all authors who have more than three (or four, or five, or six, or whatever) articles in the system. By definition, these people would represent active researchers in the

area and could be contacted to ask if they have any additional articles or data which they have not reported or which we do not have.

Action Taken

Researchers doing the most in early intervention areas were contacted for additional articles and data sets.

16. It was suggested that it would be particularly effective if the Institute could identify projects which three to 10 years ago had evaluated the effectiveness of early intervention with experimental and control groups of children. In many cases, the location of those children might still be known to the agencies who had conducted the original evaluation. If one could identify five to 10 such projects who still know where the children are, it would be an ideal opportunity for follow-up studies. The actual projects selected to work with would depend on the quality of the original design and the quality of the intervention, but identifying a larger number than are needed would leave some flexibility down the road. The difficult part will be identifying those projects. One way of doing it would be to send out a questionnaire to HCEEP project directors and former project directors sometime before the December meeting; then, as a part of our hospitality reception at the Institute meetings, we could meet with those people and see if they know about or have populations that would be appropriate.

Action Taken

Extensive efforts to identify such populations were taken. The Institute will be working with several of these projects next year.

17. It was suggested that guidelines on doing project cost analysis be developed and distributed to all HCEEP projects. All projects now approved by JDRP have to provide cost-per-child estimates, yet no guidelines are provided on how to do this. Some felt that we could provide a valuable service by coming up with such a form. One advisory member felt that the task is too complex, and any attempt to use a standard form would oversimplify and leave out important variables.

    Action Taken

    Cost protocols were developed as part of Year #1 research. The staff of two HCEEP projects were trained in their use.

18. Instead of focusing on conducting only true and quasi-experimental designs, the Institute should consider some types of descriptive research that would identify questions that need to be examined in future true and quasi-experimental designs. The Lazar follow-up studies and the Perry Preschool Project were cited as examples where this approach had been valuable.

    Action Taken

    The Institute will be examining the concommitants of intervention effectiveness using data from a North Carolina population. In addition the meta analyses yielded valuable information about important research questions.

19. Several other states were noted that may have good management information systems which track students from either preschool or first grade through later school. It may be worth checking with Oregon, Colorado, and South Dakota to determine the nature of their

record-keeping systems and to consider how such systems might fit into longitudinal follow-up efforts.

Action Taken

Contacts were made with states having management information systems in operation for preschool populations.

20. The issue was raised about why every early intervention program has winners and losers--in other words, some children who profit substantially and others for whom the program has no effect. Jackie Walker mentioned that she had 10 years of data from an early intervention program and that they had found more losers than winners but the data had never been completely analyzed.

Action Taken

The characteristics of children who benefit from intervention will be an important question for future research.

21. The suggestion was made that the Institute should establish a systematic way of keeping follow-up data on children from early intervention programs. EIRI could provide a pilot of this system using Institute funding as seed money, and then the system could be perpetuated with other funds after this five-year contract. Merle Karnes suggested that in a state like Illinois, EIRI might be able to use some of the Illinois mandated dollars and work cooperatively with them to get such a system started.

Action Taken

The Institute is currently working in two states where this could be done.

22. In terms of dissemination, a good strategy might be to go back to SEP and suggest to them that they are the experts in dissemination

and it would be helpful if they would demonstrate how we can better disseminate.

Action Taken

No action was taken although SEP does review the Institute's dissemination plan and can make recommendations.

23. Regardless of what dissemination tactics are used, it is essential that the Institute identify the major audiences that should be reached and determine how these audiences use information, how they typically get information, and in what form the information will be most accessible to them.

Action Taken

Major target audiences were identified and strategies developed for disseminating information to them.

24. A one-page announcement (the Institute may even be able to get it free of charge) in several journals which are typically read by early childhood people might be a valuable way of getting input from the field on research priorities.

Action Taken

Announcements printed free of charge appeared in most journals typically read by people involved in the field of early childhood research.

25. Henry Levin cautioned that the Institute should not be too successful with dissemination. He pointed out that the R&D Center at Stanford which he is directing is currently spending approximately $4,000 per month on the postage for disseminating materials.

Action Taken

The Institute's dissemination plan targets several different levels of information to be disseminated.

26. Henry Levin volunteered to have someone from the Institute staff visit his R&D Center and review all of the activities and materials they are currently using for dissemination.

Action Taken

David Shearer and Cie Taylor visited his center.

27. Improving dissemination efforts generated several additional ideas.
    (a) Deal directly with media on dissemination activities.
    (b) Utilize a computer assisted system for tracking inquiries.
    (c) Instead of general research conference, conduct a mini-conference involving a number of experts in the field. Have participants prepare position papers in selected areas for discussion. Produce a product.

Action Taken

Reporters from major newspapers were invited and did visit the project. A computer assisted inquiry file was developed. A mini-conference on research methodology is currently under consideration.

28. Several suggestions were given as to how we could more effectively utilize field reviewers. Reviewers gave specific comments on improving field reviewer questionnaires.
    (a) Should be open-ended with examples.
    (b) Should be simple and short.
    (c) Develop condensed version for newsletters.

Action Taken

The return rate from field reviewers was dramatically increased using the above suggestions.

29. Reviewers should be given a reception at DEC/HCEEP meetings in December where they receive an overview of EIRI, a brief description of project initial research efforts, and projections for the future. Other uses of field reviewers were suggested including:

   (a) Setting up field reviewers on specific task forces to review certain things related to their area of expertise.

   (b) Enlisting field reviewers as part of a review team to monitor quality of publications, etc. disseminated.

Action Taken

These suggestions were acted upon. A reception was held. Field reviewers having expertise in specific areas were contacted.

30. Suggestions were given for developing a field based research network for replication, etc.

   (a) Tap into exisiting networks such as CEC, NASDSE, HCEEP Rural, Interact, DEC/CEC Special NET.

   (b) Identify networks in other areas, including Health Related Fields, Social Services, Child Welfare, etc.

   (c) Get existing networks to disseminate information to the field by recognizing both EIRI and networks in materials.

Action Taken

(a) A strategy for networking with existing networks has been developed and implemented.

(b) The Institute has developed a collaborative relationship with the National Clinical Infant Center.

(c) The Institute is currently working on plans to have existing networks disseminate findings after Year #1 findings have been reviewed by SEP.

CHAPTER VII

RESEARCH TRAINING FOR GRADUATE/RESEARCH ASSISTANTS

An important part of the EIRI research activities was to provide advanced research training for research and graduate assistants from several disciplines. Some of this training has been offered at no cost to EIRI because of student's participation in existing ECC interdisciplinary training programs. The specific research training performed by the Institute has been training in procedures for specific research (meta-analysis, longitudinal research, cost-effectiveness analysis), research seminars on proposed studies, actual data collection, analysis and dissemination, individual tutorials with senior research faculty, and meeting specific research competency requirements.

Recruitment of Graduate and Research Assistants

The majority of research assistants came from five university areas: Special Education, Psychology, Communicative Disorders, Social Work, and Family and Human Development. Research assistants as a term employed in this report refers to both staff research positions and graduate students. Staff researchers are professional personnel usually at the junior level with a Bachelors or Masters Degree. Graduate students are part-time personnel who attend classes and receive salary for work up to 50% FTE on a project. Approximately 40 students from varying disciplines are employed yearly at the Exceptional Child Center to work on research or clinical projects.

Research Assistants (RA) and Graduate Assistants (GA) were identified for Year #1 as follows:

Name	Primary Responsibility	Department
Virginia Ream (RA)	Dissemination	Exceptional Child Center
Susan Watkins (RA)	Longitudinal Study	Communicative Disorders
Debra Cochran (GA)	Meta-Analysis	Special Education
David Bush (GA)	Meta-Analysis	Psychology
Kay Walker (GA)	Cost-Effectiveness	Special Education
Gary Goodrich (GA)	Meta-Analysis	Psychology
Dennis Clarkson (GA)	Meta-Analysis	Special Education
Larry Wilcox (GA)	Cost-Effectiveness	Psychology
Tish Cavalieri (GA)	Cost & Meta-Analysis	Instructional Technology
Tom Mills (GA)	Dissemination	Family & Human Development
James Pezzino(Postdoctoral)	Cost-Effectiveness	Psychology

Training Procedures

Training plans. EIRI research assistants had two training modes at their disposal. First, interdisciplinary training is a primary mission of the ECC as a UAF, and all students who worked on the EIRI enrolled for 9 credits of interdisciplinary course work. All graduate students met with the ECC director of interdisciplinary training to construct interdisciplinary training pland (ITPs) that outlined specific course work and internship experiences (other than the project to which they were assigned). Next, assistants met with EIRI professional staff to define tasks assigned within the research areas designated in this proposal.

Research training. Two primary training modes were utilized during the year.

ECC interdisciplinary training. As noted above, all graduate students employed by ECC projects formulated an interdisciplinary training plan. Many opportunities for other training or internships were provided as a result of EIRI's association with various disciplines represented at the ECC. For instance, students working on meta-analysis designed a 1-3 credit practicum in learning about various intervention models or in functioning as a member of an interdisciplinary assessment team. Such practicums were listed in the person's ITP and supervised by EIRI or ECC senior staff. EIRI also extended practica opportunities to students outside the project staff to learn specific procedures for data collection and analysis (e.g., through the workshops on meta-analysis and cost effectiveness).

EIRI project related training. Each aspect of the three research thrusts and major project activities (dissemination, evaluation and performance management system) provided research assistants with training opportunities. Formal training sessions on meta-analysis and cost-effectiveness were made available to all staff. Activities of each particular research thrust also gave students experience in data collection and analysis; reporting and disseminating findings; developing materials; and conducting training. Many other secondary skills were also developed by participation (e.g., working as a member of an interdisciplinary team, constructing questionnaires, planning the logistics and content for advisory committee meetings, dealing with political problems in the field, interviewing, programming and generating data analysis reports on computer).

Twenty-three people were trained in the initial meta-analysis training worksho conducted November 11-13. The participants included EIRI project staff and researchers form the intermountain area. Graduate student response to the workshop in the form of workshop evaluations are summarized in Appendix 7-A.

Seventeen people were trained in the initial cost-effectiveness workshop conducted in October. Again, the participants included EIRI staff and interested researchers and practitioners.

Graduate students assisted in conducting the meta-analysis and cost-effectiveness workshops at Rocky Mountain Psychological Association meetings and at Montana Symposium on Early Intervention meetings.

As part of their research training, graduate students also assisted project senior staff in dissemination activities. A total of 12 professional papers and presentations were co-authored by graduate students.

BEST COPY AVAILABLE

Appendix 7-A

EARLY INTERVENTION
RESEARCH INSTITUTE

Workshop Evaluation Form

Karl White	Nov. 11-13	Meta-Analysis
Name	Date	Workshop Title

I. EVALUATION OF INSTRUCTOR

OVERALL RATING OF INSTRUCTOR	KNOWLEDGE OF SUBJECT MATTER	ATTITUDE TOWARD SUBJECT	ABILITY TO EXPLAIN	ATTITUDE TOWARD PARTICIPANTS
17 Outstanding	22 Very well informed	23 Enthusiastic	16 Clear and to the point	21 Very helpful and understanding
6 Better than average	1 Adequately informed	__ Rather interested	5 Usually adequate	2 Interested
__ Average	__ Not well informed	__ Routine interest	__ Somewhat inadequate	__ Routine, neutral
__ Below average	__ Very poorly informed	__ Disinterested	__ Totally inadequate	__ Distant, cold, aloof
__ Poor				

II. EVALUATION OF WORKSHOP CONTENT AND FORMAT

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	
1. Overall the workshop content and format were excellent	SD	D	U	A	SA	4.52
2. The objectives of the workshop were clear	SD	D	U	A	SA	4.39
3. The balance between lecture and participant interaction in the workshop was good	SD	D	U	A	SA	4.35
4. The workshop was well structured and organized	SD	D	U	A	SA	4.70
5. The workshop was clear and understandable	SD	D	U	A	SA	4.23
6. The scope and coverage of this workshop was appropriate	SD	D	U	A	SA	4.55
7. The value I derived from this workshop was well worth the time required of me to participate	SD	D	U	A	SA	4.57
8. The workshop provided specific guidance and ideas which I can apply in my job responsibilities	SD	D	U	A	SA	4.55
9. Workshop content was summarized well and major points were easy to identify	SD	D	U	A	SA	4.45

III. THE TWO BEST THINGS ABOUT THE WORKSHOP WERE:

1. The clear step-by-step procedural methods
2. The profuse use of informative examples

IV. TWO THINGS THAT WOULD HAVE IMPROVED THE WORKSHOP ARE:

1. More time to work through examples on effect size
2. More explicit statement of statistical background required

COMMENTS: Dr. White made a complicated procedure understandable. Only a brilliant mind could explain things so well. I applaud his efforts.

I was very impressed with the instructor's expertise in the subject area.

This workshop is the first tast of this type of research I have encountered.

CHAPTER VIII

MANAGEMENT

As a result of their experience working in and managing large-scale research and development projects over the last several years, EIRI senior staff have developed a system of project management and performance measurement which refines and extends previous systems and is based on the following assumptions:

1. Detailed task analysis and timelines are essential to good project management.
2. Some management tasks are done better by computers, others by people; effective and economical management depends on recognizing which to use when.
3. Information for input into a management/performance measurement system must be reasonably economical to collect and process.
4. All participating staff must be aware and supportive of the purpose and procedures of the system.
5. The management system should facilitate identification of problem areas in time to re-allocate personnel and resources.

The management system had two major components including (1) clearly outlined personnel responsibilities, time scheduling and resource allocation guidelines with procedures for ensuring timely and successful completion of project tasks, and (2) a responsive financial accounting system. Year #1 activities for these three major components are discussed below.

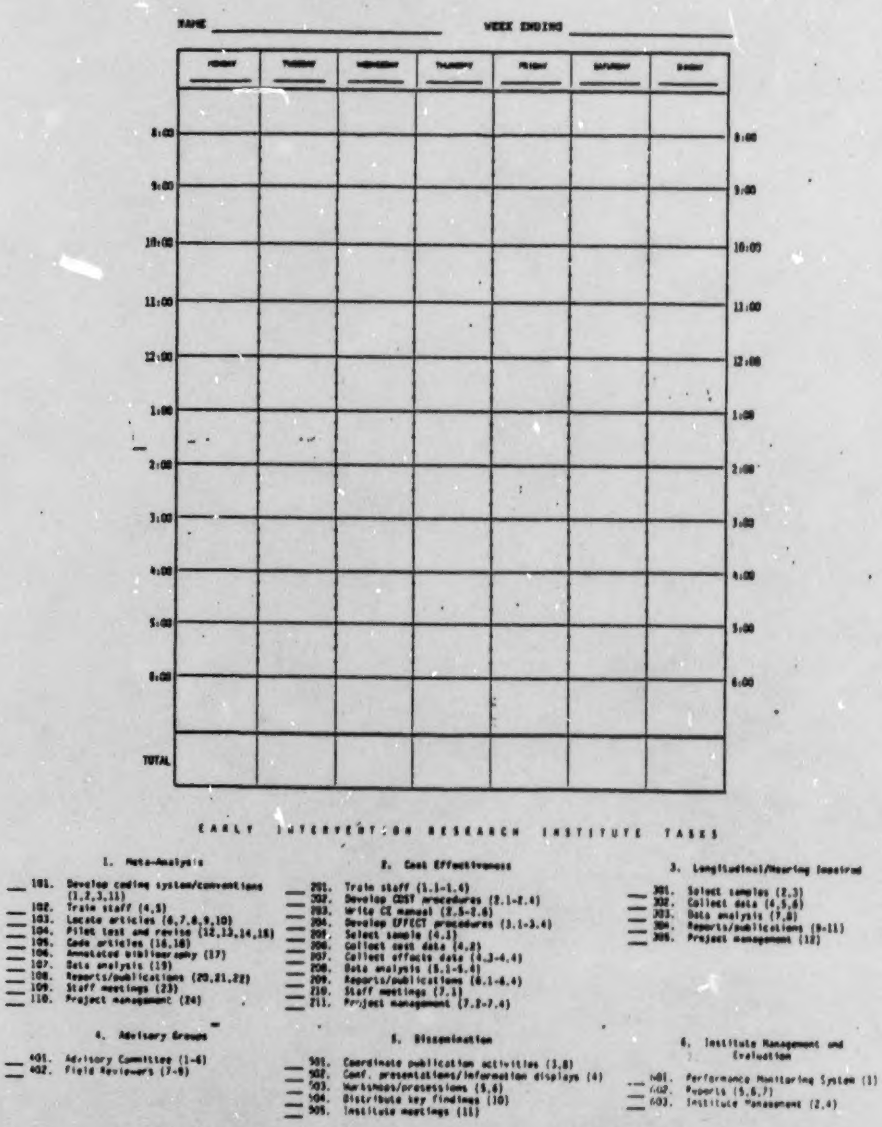
Personnel Responsibilities, Time Scheduling, and Resource Utilizations

Time lines, personnel resource allocation tables, basic task analyses, and designation of primary responsibility for each of the Institute's major tasks and subtasks were developed and refined during the first month of institute start-up activities. Project managers for each component were then assigned responsibility for keeping their component on time and for monitoring component activities.

Project managers used a time tracking system developed by the project management team to monitor time allocations to each project. The form utilized to collect time tracking data is reproduced below as Figure 8.1.

Figure 8.1

Time Tracking System



NAME ____________________ WEEK ENDING ____________________

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	
8:00								8:00
9:00								9:00
10:00								10:00
11:00								11:00
12:00								12:00
1:00								1:00
2:00								2:00
3:00								3:00
4:00								4:00
5:00								5:00
6:00								6:00
TOTAL								

EARLY INTERVENTION RESEARCH INSTITUTE TASKS

1. Meta-Analysis

___ 101. Develop coding system/conventions (1,2,3,11)
___ 102. Train staff (4,5)
___ 103. Locate articles (6,7,8,9,10)
___ 104. Pilot test and revise (12,13,14,15)
___ 105. Code articles (16,18)
___ 106. Annotated bibliography (17)
___ 107. Data analysis (19)
___ 108. Reports/publications (20,21,22)
___ 109. Staff meetings (23)
___ 110. Project management (24)

2. Cost Effectiveness

___ 201. Train staff (1.1-1.4)
___ 202. Develop COST procedures (2.1-2.4)
___ 203. Write CE manual (2.5-2.6)
___ 204. Develop EFFECT procedures (3.1-3.4)
___ 205. Select sample (4.1)
___ 206. Collect cost data (4.2)
___ 207. Collect effects data (4.3-4.4)
___ 208. Data analysis (5.1-5.4)
___ 209. Reports/publications (6.1-6.4)
___ 210. Staff meetings (7.1)
___ 211. Project management (7.2-7.4)

3. Longitudinal/Hearing Impaired

___ 301. Select samples (2,3)
___ 302. Collect data (4,5,6)
___ 303. Data analysis (7,8)
___ 304. Reports/publications (9-11)
___ 305. Project management (12)

4. Advisory Groups

___ 401. Advisory Committee (1-6)
___ 402. Field Reviewers (7-9)

5. Dissemination

___ 501. Coordinate publication activities (3,8)
___ 502. Conf. presentations/information displays (4)
___ 503. Workshops/presessions (5,6)
___ 504. Distribute key findings (10)
___ 505. Institute meetings (11)

6. Institute Management and Evaluation

___ 601. Performance Monitoring System (1)
___ 602. Reports (5,6,7)
___ 603. Institute Management (2,4)

Time tracking data was aggregated on a weekly basis by a project clerk and reported to SEP on a monthly basis.

The summaries of time tracking information were utilized by project managers to review status of project tasks and to re-allocate resources as needed. Table 8.1 presents a summary of personnel allocations for the first year of institute activities.

Table 8.1

Summary of Personnel Allocation

SUMMARY OF PERSONNEL ALLOCATION AND STATUS
OF TASKS FOR MONTH OF SEPTEMBER

(100.00% of contract elapsed)

	META	COST	LONG	ADVI	DISS	MNGT	HR/MO	PROJ	YTD/HR	WORK/ PROJ	STATUS
STAFF:											
AUSTIN	0.00	0	0	0	0	0	0.00	322	264.50	0.82	-57.50
BARRY	1.50	36.00	0	0	0	11.50	49.00	0	49.00	---	49.00
CASTO	18.00	0	0	5.00	11.00	73.00	107.00	1135	1288.75	1.13	153.75
CLARK	0.00	0	0	0	0	0	0.00	104	71.00	0.68	-33.00
CLARKSON	0.00	0	0	0	0	0	0.00	960	784.50	0.81	-175.50
EKONG	36.25	0	0	0	0	0	36.25	384	338.50	0.88	-45.50
GARCIA	0.00	0	0	0	0	0	0.00	0	301.50	---	301.50
GOODRICH	117.75	0	0	0	0	0	117.75	960	860.00	0.89	-100.00
JEWETT	139.50	0	0	0	0	0	139.50	950	1518.50	1.59	568.50
JOHNSON	0	228.00	0	0	0	0	228.00	697	2052.65	2.94	1355.65
MILLS	0.00	0	0	0	32.00	0	32.00	960	692.00	0.72	-268.00
MORROW	0	11.50	0	6.00	63.25	105.75	186.50	586	805.00	1.37	219.00
PEZZINO	142.00	0	0	0	0	0	142.00	0	1223.25	---	1223.25
PIMENTEL	6.50	25.00	0	0	2.00	19.75	53.25	0	53.25	---	53.25
REAM	0.00	0	0	0	12.00	0	12.00	498	321.75	0.64	-176.25
REEDER	170.25	0	0	0	0	0	170.25	960	791.75	0.82	-168.25
SHEARER	0	0	0	0	10.00	4.00	14.00	628	500.50	0.79	-127.50
TAYLOR	0.50	71.75	0	0	31.25	42.00	145.50	1680	1793.25	1.06	113.25
TINNAKUL	0	32.50	0	0	0	73.50	106.00	1269	1933.00	1.52	664.00
WATKINS	0	0	38.00	0	0	0	38.00	536	670.50	1.25	134.50
WHITE	28.00	13.00	2.50	0	0	45.50	89.00	908	1170.25	1.28	262.25
WILCOX	22.75	72.25	0	0	0	0	95.00	960	972.25	1.01	12.25
MONTHLY TOTALS	683.00	490.00	40.50	11.00	161.50	375.00	1761.00		18455.65		
TOT HOURS PROJ.	6939	4217	1088	318	1518	1314		15394			
YTD HOURS/TASK	6668.2	6440.6	1187.0	417.5	1725.7	2016.5			18455.65		
YTD HOURS/ PROJ HOURS	0.96	1.52	1.09	1.31	1.13	1.53					
SURPLUS/DEFICIT RELATIVE TO ELAPSED TIME	-270.75	2223.65	99.00	99.50	207.75	702.50					2331.65

As may be seen from reviewing this table, a total of 15,394 hours were projected for all project components. Institute staff members actually worked a total of 18,455 hours on project components. This was accomplished by having one project staff member (Pezzino) funded by Utah State university for 1,223 hours and by getting significant contributions of extra hours from Casto, White and Taylor.

In looking at specific project components, it may be noted that with the exception of the meta-analysis component, extra hours were required for all other components. The amount of time required to complete the cost-effectiveness component was 6,440 hours with only 4,217 hours projected and budgeted for.

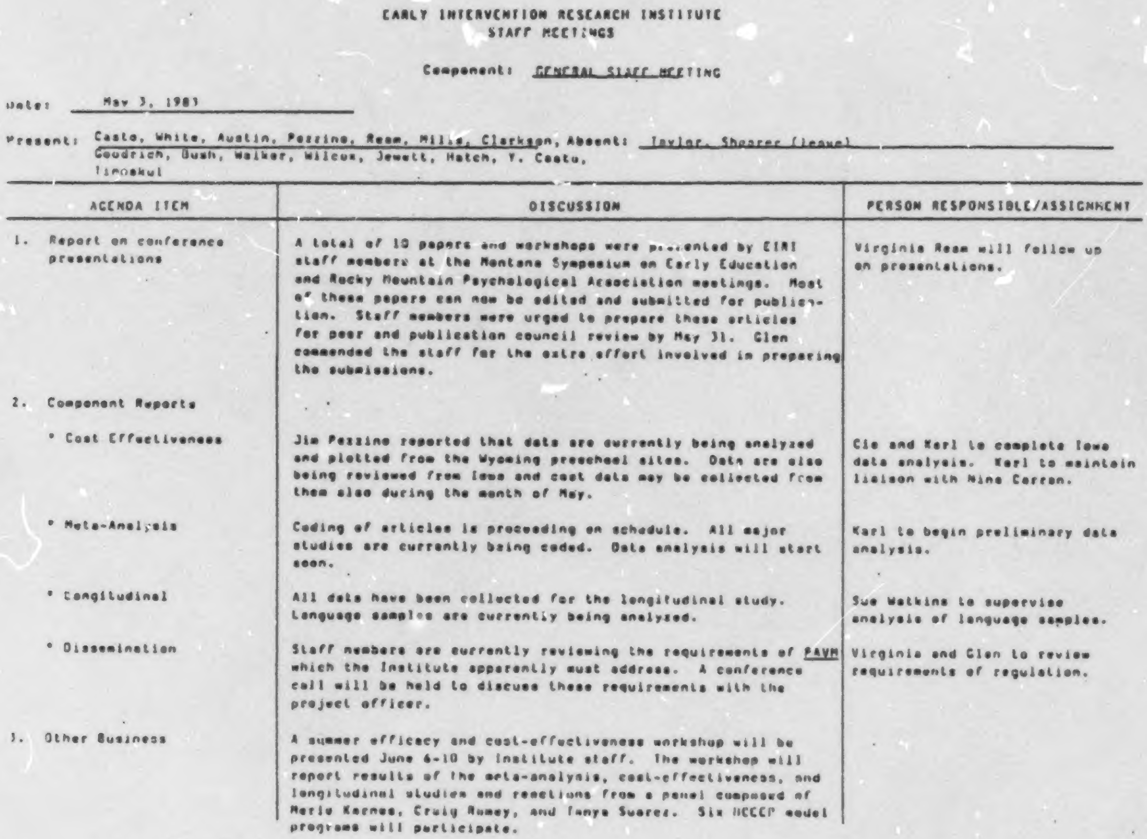
Staff Meetings

Weekly staff meetings were held for every research component. The project management team (Casto, White and Taylor) met weekly on Monday and other component meetings were held on other days of the week.

At staff meetings, accomplishments of the previous week were reviewed, issues discussed, and assignments and projections for the following week were made.

Each person at the staff meeting kept notes on his particular assingments using the left-hand column of a form developed by this project. During the subsequent week, the staff person would complete the right-hand column, not nay issues which needed to be addressed during staff meeting, and hand in the form by 8:30 a.m. on the day of the meeting. The project director used the summary of these forms (completed by the secretary) to make up a written agenda for the staff meeting.

Following staff meeting, the project director dictated the minutes for the meeting, with particular focus on decisions made and timelines for assignments. These minutes follow the format shown in Figure 8.2 and were distributed to each staff person and the Institute Director. Copies of the minutes were also included in monthly reports to SEP.



EARLY INTERVENTION RESEARCH INSTITUTE
STAFF MEETINGS

Component: GENERAL STAFF MEETING

Date: May 3, 1983

Present: Casto, White, Austin, Pezzino, Ream, Mills, Clarkson, Goodrich, Bush, Walker, Wilcox, Jewett, Hatch, Y. Casto, Timoskul

Absent: Taylor, Shearer (leave)

AGENDA ITEM	DISCUSSION	PERSON RESPONSIBLE/ASSIGNMENT
1. Report on conference presentations	A total of 10 papers and workshops were presented by EIRI staff members at the Montana Symposium on Early Education and Rocky Mountain Psychological Association meetings. Most of these papers can now be edited and submitted for publication. Staff members were urged to prepare these articles for peer and publication council review by May 31. Glen commended the staff for the extra effort involved in preparing the submissions.	Virginia Ream will follow up on presentations.
2. Component Reports		
• Cost Effectiveness	Jim Pezzino reported that data are currently being analyzed and plotted from the Wyoming preschool sites. Data are also being reviewed from Iowa and cost data may be collected from them also during the month of May.	Cie and Karl to complete Iowa data analysis. Karl to maintain liaison with Nina Carran.
• Meta-Analysis	Coding of articles is proceeding on schedule. All major studies are currently being coded. Data analysis will start soon.	Karl to begin preliminary data analysis.
• Longitudinal	All data have been collected for the longitudinal study. Language samples are currently being analyzed.	Sue Watkins to supervise analysis of language samples.
• Dissemination	Staff members are currently reviewing the requirements of PAVM which the Institute apparently must address. A conference call will be held to discuss these requirements with the project officer.	Virginia and Glen to review requirements of regulation.
3. Other Business	A summer efficacy and cost-effectiveness workshop will be presented June 6-10 by Institute staff. The workshop will report results of the meta-analysis, cost-effectiveness, and longitudinal studies and reactions from a panel composed of Merle Karnes, Craig Ramey, and Tanya Suarez. Six HCEEP model programs will participate.	

Figure 8.2. Early Intervention Research Institute Staff Meeting Minutes.

At the end of each month, information was collected from staff members to provide SEP with the required projection information.

Financial accounting. Official financial records for the project were managed by the Utah State University Controller's Office. However, to provide SEP with more timely expenditure information detailed by each task, the project provided detailed financial information with each monthly administrative report which showed the project expenditures by task and individual. This financial information was summarized for each major task using an existing microcomputer program.

Major budget problems encountered during year one were higher than anticipated costs on the longitudinal analysis of hearing impaired project brought about by increased travel costs and increased travel costs for the cost-effectiveness component. Utah State University contributed considerable travel costs and one budget transfer was requested and approved to cover others. The project ended the year with no budget deficits.

Appendix 2-A

References of Studies Included and Yet to be Included in the Early Intervention Meta-Analysis

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Appendix 2-C

List of Advisory Committee and Field Reviewers
Letters Sent to Solicit Articles for Meta-Analysis

Membership of EIRI Advisory Committee

Gene V Glass, Ph.D.	Professor of Education & Psychology, Co-director of Laboratory of Educational Research, University of Colorado
Henry Levin, Ph.D.	Professor of Economics and Education, Director of the Institute for Research on Educational Finance and Governance, Stanford University
Craig Ramey, Ph.D.	Professor of Psychology and Director of Research at the Frank Porter Graham Child Development Center, University of North Carolina
Merle Karnes, Ph.D.	Professor of Education, Institute for Child Behavior and Development, University of Illinois
Peter Fanning	Director of Special Education, Colorado Department of Education
Tal Black	Past President of the Division of Early Childhood (DEC) and Associate Director of the Technical Assistance Development System (TADS)
Sharon Hixon	Administrator and classroom teacher with a preschool cooperative in the state of Kansas
Jessica Strout	Parent of a handicapped child and chairperson of Friends of the Children's Center Board
Phillip Strain	Director of Pittsburgh Early Intervention Institute, University of Pittsburgh
Rune Simeonsson	Investigator, Carolina Institute for Research on Early Intervention for the Handicapped
Nina Carran	Director of a state implementation grant (IOWA)

Field Reviewers for EIRI

Name	Position	State	Phone Number
Nina Carran	Project Director	Iowa	(712) 274-6050
Robert Crow	Project Director	Montana	(406) 243-5467
Pam Frakes	Project Director	Tennessee	(615) 741-2633
Bud Fredericks	Project Director	Oregon	(503) 838-1220
Corinne Garland	Project Director	Virginia	(804) 229-6360
Linda Gilkerson	Project Director	Massachusetts	(617) 734-5200
Bea Gold	Project Director	California	(213) 664-2937
Patricia Hutinger	Project Director	Illinois	(309) 298-1634
Robert Kibler	Project Director	Tennessee	(615) 322-8425
Jeanne McCarthy	Project Director	Arizona	(602) 621-3214
Paul Swatensbarg	Project Director	Idaho	(208) 334-4181
Amy Toole	Project Director	New York	(516) 576-1121
Jamie Tucker	Project Director	Texas	(214) 741-5386
Ruth Turner	Project Director	Texas	(214) 741-1620
Ann Zaccardi	Project Director	Massachusetts	(617) 667-8300
Reid Zehrbach	Project Director	Iowa	(319) 399-6875
Kathy Blanque	Parent	Louisiana	(504) 283-4728
Erica Woodcock	Parent	Oregon	(503) 757-9610
Sue Chappel	Teacher	Washington	(206) 587-5625
Diane Holland	Teacher	Michigan	(313) 898-7200
Beverly Johnson	Teacher	Michigan	(313) 494-1751
Karlene Knebel	Teacher	North Carolina	(919) 942-6491
Kris Montgomery	Teacher	Illinois	(309) 672-6340
Caryn Robbins	Teacher	Kansas	(913) 864-4698
Pat Robinson	Teacher	Wyoming	(307) 754-2964
Donna Rokicki	Teacher	Illinois	(312) 748-5398
Marsha Shearer	Teacher	Washington	(206) 242-9400
Susan Weber	Teacher	New Hampshire	(603) 448-1373
Nicholas Anastasiow	Researcher	New York	(212) 570-5118
Diane Bricker	Researcher	Oregon	(503) 686-3568
Jo Bunce	SEA	Virginia	(804) 225-2883
Jack Cole	Researcher	New Mexico	(506) 646-1525
Carl Dunst	Researcher	North Carolina	(704) 433-2661
Rebecca Fewell	Researcher	Washington	(206) 542-1685
David Franks	Researcher	Wisconsin	(715) 836-5740
Michael Guralnick	Researcher	Ohio	(614) 422-8365
Alice Hayden	Researcher	Washington	(206) 543-8565
Jeanette Walker-McCallum	Researcher	Illinois	(217) 333-0260
Katie McCartan	Researcher	Iowa	
Nancy Peterson	Researcher	Kansas	(913) 864-4954
Mary Tom Riley	Researcher	Texas	(806) 742-3296
Earl Schaefer	Researcher	North Carolina	(919) 866-2017
Phillip Sipos	Researcher	Louisiana	(504) 872-3625
William Swan	Researcher	Georgia	(404) 542-1685
Ted Tjossem	Researcher	Maryland	(301) 496-1383
Warren Umansky	Researcher	Georgia	(404) 542-1685
Shari Vaughan	Researcher	New Hampshire	(603) 862-1730
Brian McNulty	SEA	Colorado	(303) 866-2727
John Melcher	SEA	Wisconsin	(608) 233-6923
Kenneth Reavis	SEA	Utah	(801) 533-5982

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EARLY INTERVENTION RESEARCH INSTITUTE
Universally Affiliated EXCEPTIONAL CHILD CENTER

February 15, 1983

Project Director
Precise Early Education for Children with Handicaps
University of Illinois
Colonel Wolfe School
603 East Healey
Urbana, IL 61820

Dear Sir/Madam:

We are currently conducting a project funded by the Department of Education's Special Education Programs Branch to examine the efficacy and cost effectiveness of early intervention programs for handicapped children. As a part of that contract, we are conducting a meta-analysis of previous research on early intervention for handicapped and at-risk children. We are writing to current and past directors of programs which provide early intervention services to handicapped or at-risk children to solicit assistance in conducting this project.

We would like to obtain any reports, journal articles, or other descriptions you have about your project or other projects which provide experimental data concerning the efficacy of early intervention programs. We are particularly interested in obtaining reports of research using randomized, true experimental designs. However, we are also interested in quasi-experimental designs, pre-post designs, and other types of comparative data that yield estimates of what effect the program had on children as compared to children who did not receive early intervention. We have already conducted an extensive computer-assisted literature search and have obtained most of the reports which are published in professional journals.

Rather than send you the entire listing, however, and asking you to wade through and add to that list, we would appreciate it if you could suggest to us any references or provide us with actual copies of articles or reports of which you are aware but which have probably not been published in the easily accessible literature. Let us know if there is any cost associated with obtaining any materials you send.

Also, when you reply, if you would like to have an executive summary of the meta-analysis findings when it is completed in approximately eight months, please let us know. Thank you very much for your assistance.

Sincerely,

Glen Casto
Glendon Casto, Ph.D.
Director

Karl R White
Karl R. White, Ph.D.
Co-Director

KRW:mml

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EARLY INTERVENTION RESEARCH INSTITUTE
University Affiliated EXCEPTIONAL CHILD CENTER

February 16, 1983

Noel B. Croft
P.O. Box 610
Paul, ID 83347

Dear Dr. Croft:

We are currently conducting a project for the Department of Education to conduct a meta-analysis of the literature on early intervention. We are writing to current and past directors of programs which provide early intervention services to handicapped or at-risk children to solicit assistance in conducting this project. First, we would like to obtain any reports, journal articles, or other descriptions you have about your project or other projects which provide experimental data concerning the efficacy of early intervention programs. We are particularly interested in obtaining reports of research using randomized, true experimental designs. However, we are also interested in quasi-experimental designs, pre-post designs, and other types of comparative data that yield estimates of what effect the program had on children as compared to children who did not receive early intervention. We have already conducted an extensive computer-assisted literature search and have obtained most of the reports which are published in professional journals. However, we believe there are many other reports containing valuable data that may not have been published in journal form. If you know of such reports, we would appreciate it if you could send us references or actual copies if you have them available. Let us know if there is any cost associated with obtaining any materials you send.

Secondly, in conducting the meta-analysis, a critical question is whether various curriculum approaches are differentially effective. Unfortunately, even though specific curriculum packages are frequently referenced, the description of curriculum packages contained in journal articles and some final reports is so sketchy that it is difficult to make judgments concerning the exact nature of a curriculum.

Your curriculum is listed in a publication produced recently by the Technical Assistance Development System (TADS). We would like to obtain a copy of your curriculum package in order to have it available for determining the type of intervention package used when articles refer to it. Could you please inform us what the cost would be of obtaining a copy of your curriculum. Given the number of different curriculum packages we are trying to obtain, if there is any possibility you may be able to contribute an extra copy of your package, we would appreciate it. However, we realize that with the current tight times that may be difficult. We do have some money available for obtaining curriculum packages. If there is a cost, let us know and we will see how far we can stretch our budget.

Finally, if you would like to obtain an Executive Summary of the results of the meta-analysis when it is completed in about eight months, please let us know and we would be happy to send one to you. Thank you for your assistance.

Sincerely,

Glendon Casto
Glendon Casto, Ph.D.
Director

Karl R. White
Karl R. White, Ph.D.
Co-Director

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May 26, 1983

Regional Intervention Program
RIP Expansion Project
2400 White Avenue
Nashville, Tennessee 37204

Dear Sirs:

The Early Intervention Research Institute located at Utah State University has been funded by the Department of Education, Special Education Programs,to conduct a five-year study of the efficacy and cost benefit of early intervention with handicapped children. As a part of that resarch program, we are currently in the midst of conducting a meta-analysis of the previous research which has examined the efficacy of early intervention with handicapped or at-risk children. We are trying to locate as many articles as possible that have examined the effect of early intervention with handicapped or at-risk children.

We have done what we believe to be a reasonably comprehensive search of the published literature, but suspect that we may not have obtained many project reports and other unpublished documents reporting research on early intevention. We are particularly interested in locating studies which have used true experimental designs, but would also like to obtain reports of quasi-experimental, pre-post, or other designs which have drawn conclusions about the effect of early intervention program compared to no early intervention program, of the effect of one type of early intervention compared to another type of early intervention. In the course of trying to locate articles we have contacted many people who we knew were involved in the provision of early intervention programs. Your name was suggested to us by one of our contacts as someone who might have or know of articles which should be included in our analysis.

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Since we have already located approximately 1500 articles, it would be very time consuming for you to wade through the list of articles to see if you know of any additional articles. Therefore, we are asking you to send us either references of actual copies of articles which you believe we may not be aware of that should be included. Again, we feel that we have done a fairly comprehensive job of searching the published literature, so we are primarily interested in articles which ahve not yet been published or are not likley to have been published. If there is any cost in sending us copies of articles for which you would like to be reimbursed, please let us know and we would be happy to do that. In addition, if you sould like a copy of the executive summary of the meta-analysis, please indicate this in your return letter. Thank you for your assistance.

Sincerely,

Karl R. White, Ph.D.
Co-Director

KRW/lj

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Appendix 2-D

Procedures for Early Intervention Meta-Analysis

PROCEDURES FOR EARLY INTERVENTION META-ANALYSIS

I. OBTAINING ARTICLES FOR CODING

A. Articles to be considered for the meta-analysis are obtained from the following sources:

1. Articles which previous reviewers of early intervention effectiveness have cited as containing experimental data regarding the efficacy of early intervention.

2. Articles obtained through a computerized search of Psychological Abstracts, Dissertation Abstracts, ERIC, CEC Abstracts, Index Medicus, and Social Science Abstracts using the procedures outlined in Appendix A. Abstracts resulting from this computerized search were sorted by project staff, and articles which appeared to contain experimental data regarding the efficacy of early intervention were identified.

3. Suggestions resulting from a letter to all current and previous HCEEP project directors asking them to identify final reports, journal articles, or other descriptions of experimental research which has investigated the efficacy of early intervention with handicapped and at risk children.

4. Articles cited in one of the articles being coded after being obtained from one of the other three sources.

No extensive efforts were made to obtain reports from Head Start projects although reports obtained through one of the four procedures described above which utilized Head Start children were not excluded. Head Start project reports were generally not included. Any report which examined the efficacy of early intervention using true experimental, quasi-experimental, pre-post, single subject, or correlational designs was included as long as the report yielded some estimation of the impact of early intervention for participating children, parents, or family members. Impact was generally defined as whether a person who has experienced early intervention is functioning better than a person who has not experienced early intervention, or whether a person who experienced one type of early intervention was functioning better than a person who received another type of early intervention. Such estimates of impact could be obtained using either comparisons of participants versus nonparticipants, or comparisons of before and after measures.

B. For each article to be obtained, it should be noted whether it is most probably an article to be included in the meta-analysis (indicated with an "I"), a review ("R"), or something else ("O" for other). Each request made should include one of these designations. In the "other" category, be careful not to indicate articles unless they are directly relevant to the purpose of our meta-analysis. Many articles will be related (e.g., behavior management techniques for teachers), but we will be overwhelmed if we obtain all related articles. So use this category sparingly.

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When a request is made, as complete a reference as possible will be entered on a 5" x 7" card such as that shown below. When an abstract is available, it should be affixed to the back of the card.

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Merrill Library	Interlibrary Loan	Request to Author

Type of Article
Meta-analysis
Review
Other ______________

Sources of Article
Computer Search
References
Colleague's Suggestion
Bibliographies
Other ______________

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The card will be put in alphabetical order in the "SEARCH NOTEBOOK". Each effort (along with the data) made to obtain an article will be noted on the card for that article. Merrill Library resources should always be checked first, the Interlibrary Loan, then writing directly to the author. When an article is obtained, note the date it was obtained, file the article as explained below, and remove the card from the "SEARCH BOOK" and file the card in the "MASTER CARD FILE". Cards in the MASTER CARD FILE should never be removed. After all avenues for obtaining the article have been tried unsuccessfully, file the card in- the MASTER CARD FILE: ARTICLES UNOBTAINABLE.

If the article is not obtainable at Merrill Library, note the dates and sources checked, and go through Interlibrary Loan (ILL) to obtain the article if appropriate. Note the date a request was made and file a copy of the ILL request in the Follow-Up folder for the date ordered. If the article does not arrive after 4 weeks, a check will be made with ILL to see what the problem is.

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If the article cannot be obtained from ILL, a request will be sent to the author using a standard letter. At the time the form letter is sent, a copy will be placed in the Follow-Up folder. If no article is received within four weeks, a follow-up request should be made with a copy placed in the follow-up folder. Up to three follow-up requests should be made before giving up. Any articles obtained by this method should be acknowledged with a thank-you postcard.

C. All articles obtained in Step A will be filed in the "NEW ARTICLES" file by Lora. These articles will be screened by Ben to determine if they are appropriate for the meta-analysis (i.e., does the article contain information which can be used to estimate the impact of early intervention; did the intervention begin before 5 years of age; were children in the intervention program handicapped, at risk, or disadvantaged). For each article screened, Ben will fill out a disposition sheet. For those articles which he determines to be uncodable (category A on the disposition sheet), he will write a short explanation as to why it is uncodable, file the article in the "UNCODABLE, NEEDS CHECKING" file, and file the disposition sheet in Lora's master notebook. Gary will be responsible for double-checking all articles in the "UNCODABLE, NEEDS CHECKING" file to confirm that they are definitely uncodable. Any questions about codability should be raised with Karl. When Gary has confirmed that an article is uncodable, he will initial the disposition sheet on Category A and scan the references for any articles which are appropriate for the meta-analysis and consider whether the article is appropriate for a "future mini meta-analysis (in which case, he will note it on an appropriate sheet). He will then file the article in "CODING COMPLETED: CHECK REFERENCES" file. After Lora has checked the references, she will return the article to the "MASTER ARTICLE" file.

D. When it is determined that an article is probably codable, Ben will note the date of the determination on the disposition sheet and attach the disposition sheet to the article. He will then quickly screen the article to determine if it is a description of a project for which we have other articles in the file or to see if other articles are cited which should be coded together with this article. Related articles which describe the same intervention project should all be coded at the same time by the same coder so that we have as much information about that project as possible. If related articles need to be obtained, Ben will work with Lora to obtain those articles. Related articles will be clipped together and a single disposition sheet will be filled out with all related article ID #'s on the same sheet. After screening has been completed, the article will be filed in the "TO BE CODED" file.

E. Lora will be responsible for distributing articles to coders. Each coder will have a place on the shelf in 173-C labeled with their name. Articles to be coded will be placed on the shelf by Lora. Lora will be responsible for keeping from 3 to 5 articles in each person's "Code Box" at all times. Articles should always be coded in the order in which they are on the shelf (i.e., from top to bottom).

II. CODING

A. Each article should be coded following the procedures outlined in the training sessions and staff meetings. Particular attention should be given to the checklist on the first page of the coding packet to make sure that all of these items have been completed. It is important that, as much as possible, each article be completely coded before moving on to another article.

B. Tracking and disposition of articles will require the following procedures. When an article is distributed for coding, the disposition sheet will be filed by article ID # in Lora's Master Notebook. This sheet will always remain in the notebook. When an article is finished (final coding, or determined uncodable), Lora should be informed so the disposition sheet can be updated. This notebook will be our master information file so that at any time, we will be able to determine where an article is and what is happening to it. DO NOT REMOVE DISPOSITION SHEETS FROM THE NOTEBOOK. In addition, Lora will keep a sheet for each coder on which she will record which articles have been given to which coders. These sheets will be updated by the coders as they finish articles and will help me as the project director to keep track of everyone's coding activity so that I will be able to balance the load on other assignments. The steps through which an article will go from the time it is put on your shelf by Lora to be coded are described below. After reading the article, you will determine whether it is:

1. Uncodable: in which case you will note on the disposition sheet what outcome data is reported in the article, why you believe it to be uncodable, have another staff member check your logic using the same procedures described below for checking effect size computation, and return the article to the place on the shelf marked "FINAL CODING COMPLETED--CHECK REFERENCES". Before returning the article, review the references to determine if the article cites other reports which would very likely be appropriate for coding in the meta-analysis. Those articles which are appropriate, mark with an "A". Be reasonably certain about the appropriateness of a referenced article for meta-analysis before marking it. Also indicate with an "R" review articles of early intervention efficacy which should be obtained for later analysis; and with an "O", other articles which you think should definitely be in our files which are neither "A" or "R". Be careful not to mark too many "O's".

2. Uncodable as it--additional information needed: Coders may determine that an article would be codable if additional information could be obtained either from the author or from another article which is referenced. In those cases, the article should be kept by the coder and action should be initiated to obtain the additional information either by contacting Lora or filling out a request for information sheet described below. The disposition sheet for that article should be completed indicating that either (D) related articles have been requested or (E) information from the author has been requested. As soon as the information is obtained, coding of the articles should be completed.

3. Codable--more information requested: In some cases, an article will be codable but additional effect sizes, or clarification of confusing information in the article on critical attributes will be possible if additional information were obtained from the author or from other articles. In other words, enough coding might be completed that the article could be utilized in the meta-analysis but more information would result in additional effect sizes or more accurate or complete coding. In those cases, the article should be placed under the author's name on the shelf space labeled "INTERIM CODING COMPLETED--WAITING", then action initiated to obtain the necessary information. The disposition sheet should also be updated to show that coding which is usable for the meta-analysis has been completed but more information is requested (categories F or G). As sonn as the information is obtained, the article will be completed and placed on the shelf in the "FINAL CODING COMPLETED: TO BE CHECKED".

4. Complete codable as is: If the article is codable as is without additional information, the coding should be completed and placed on the shelf in the "FINAL CODING COMPLETED: TO BE CHECKED" category.

C. Before any articles are placed in [illegible] "FINAL CODING COMPLETED: TO BE CHECKED" or the "INTERIM CODING COMPLETED" categories, another member of the staff should be asked to check the coding. Particular attention should be given to item I-5 (type of comparison), the number of effect sizes which were computed, the actual computation of the effect sizes, the checklist (especially items marked NA), use of decimals in inappropriate places, coding months instead of weeks, and use of "N" codes. This is the only check of the coding sheet done before it goes to keypunching, so it should be done carefully. Each coder is responsible for finding a person to make these checks and should be prepared to provide a three-minute synopsis of the experimental design and their rationale for classifying the type of design, the effect sizes coded, and where information in the article is located which they used to compute effect sizes. The checker will then independently calculate effect sizes. Any disagreements which are not immediately resolvable should be brought to Karl's attention. A list will be posted with names of all of the staff to help balance the load on checking effect sizes. Each time someone is asked to check the effect sizes of another article, they should list the article ID number under their name. When someone needs to have their article checked, they should look at this list and, where possible, ask those people to check the article who have been used least in the past. However, the primary concern is efficiency so don't wait for three days to find someone who has only checked a limited number of articles. Use available people and then try and balance the load among those people who are available.

D. All articles placed in the "FINAL CODING COMPLETED: TO BE CHECKED" box will be reviewed by Ben to gather information for staff meetings on convention clarifications and identify articles to be included in the reliability checking.

E. Approximately every tenth article to be coded will be used as a reliability check article. Karl will determine which articles are to be used as reliability articles and who will do the reliability coding for a particular article. To avoid unnecessary duplicative coding on reliability check articles, the following procedures will be followed. Whenever you are given an article to code, complete the coding for from 1-4 ES only. If more ES's should be coded, list the additional ES which you think should be coded on the back of the first page of the coding packet. Complete all steps in the checklist except #6 (alternative ES computation), #9 (request for additional information), #13 (description of intervention), and #14 (dictate abstract). Then check with Lora as to whether your name appears on the disposition sheet. If it does, finish coding the article including all ES and all steps in the checklist. If it doesn't, place the article on the "FINAL CODING COMPLETED: TO BE CHECKED" shelf. People doing the reliability coding will not know which articles are reliability check articles. In the early stages of coding, more frequent reliability checks will be done with people who are having trouble achieving consistency with other coders. Ben will be given a list of all articles which are reliability check articles. When an article has been placed in the "FINAL CODING COMPLETED: TO BE CHECKED" category and Ben identifies it as a reliability article, he will place the article in the "CHECKED--COMPLETE RELIABILITY" box.

F. When all of the articles for a particular reliability check have been completed, Ben will compute interrater reliability using the procedures outlined in Appendix B to compute the reliability of the article. Ben will summarize these data for Karl who will use them to conduct ongoing training with the staff and to modify conventions. In addition, Ben will accumulate the data from each reliability check into a master summary of interrater reliability. Reliability results and issues will be raised in the weekly staff meeting and necessary modifications to the conventions made. After a reliability check is made, the primary coder (whose name is on the disposition sheet) should check with other coders to achieve consensus on any items coded differently. Changes should be made on the primary coder's sheets, and coding sheets for the reliability checkers should be filed in "RELIABILITY CODING SHEETS". The primary coder's packet will be filed in the "CHECKED: OBTAIN REFERENCES" slot.

G. After articles are placed in the "CHECKED: OBTAIN REFERENCES" slot, Lora will review the references in the article to obtain any references that are relevant to the meta-analysis project. She will also separate the pages on "Notes on Clarification of Conventions", "Descriptors/Guidelines for Annotated Bibliography", "Future Mini Meta-Analyses", and "Description of the Intervention Program", make sure each of these pages has the article ID number clearly written on it, and file each of them in the appropriate file in the master file. She will also check the DISPOSITION SHEET file to make sure that the disposition sheet has been updated. She will then return the article to the MASTER ARTICLE file. The coding sheets will be returned to the file labeled "CODING SHEETS TO BE KEYPUNCHED". Whenever there are more than four effect sizes codable from an article, all of the coding sheets relevant to effect sizes 1 through 4 should be stapled together, those relevant to effect sizes 5 through 8 should be stapled together, etc.

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H. When coding, pay particular attention to completing information regarding (1) description of the intervention, (2) articles relevant for future mini meta-analyses, (3) annotated bibliography, (4) computation of alternative effect sizes, and (5) clarification of conventions. More specific instructions for each of these categories are given below.

1. Description of intervention. Each coder should make a photocopy of any information from the article or report which describes the details of the particular intervention program used. Attach this information to the coding sheet when you complete the coding for that article as described above. This information will be used later as we analyze the contents of each intervention and attempt to categorize interventions into different types. Our plan is to have one or two people work on this aspect of the project intensively over a two- to three-week period after all other coding is completed. This should enable us to more accurately categorize the types of frequently used interventions rather than developing an elaborate sorting system before we know the actual content of the domain that is being sorted.

2. Future mini meta-analyses. Page 11 of your coding packet includes a number of topics (at this time, 16) for which we want to identify any articles which could be used in the future for doing an in-depth analysis of these issues. The reason for having the sheet is that one of the most difficult steps in doing an analysis of issues such as these is identifying the articles which are relevant to a particular issue. As we are reading the hundreds of articles which will be read during the primary meta-analysis, we will note certain articles which are being read which are directly related to that issue, or the articles we are reading will refer us to other articles which they suggest are directly related to that issue. To modify our primary coding sheet so that it would provide us with the information necessary for a detailed analysis of those issues would make the primary coding sheet extremely cumbersome. Therefore, the alternative is to note which articles are relevant, then when we finish the primary meta-analysis, to go back and for each topic create a more detailed analysis system which will apply only to those 30 to 50 articles which we have identified. For example, the relation of parent IQ to intervention effectiveness has been suggested recently as an important concomitant variable in determining the effectiveness of early intervention. This information is reported in very few articles, therefore, it does not make sense to modify our coding sheet for the primary meta-analysis to collect data about this topic. However, as we are reading a study, we may find information related to this issue; or we may find references to other articles which do provide relevant information. In that case, we should list the ID number of the article which we are coding under that particular category or the author and year of the articles to which they reference us. Most of the factors listed on that sheet are now self-explanatory. If you have any question about what types of articles should be included in each category; or, if during the coding process you want to add another topic, see Karl.

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3. Annotated bibliography. As a part of the contract, we are to be developing an annotated bibliography of research which has examined the efficacy of early intervention. A sheet for providing information to be used in developing the annotated bibliography is attached as the last page of your coding packet. Under each of the 10 categories at the top, check all the descriptors which apply to that article. Then dictate or write a 150-word (maximum) abstract using the guidelines provided. Marilyn has dictaphones available for checkout for dictating the abstract. Only check out the dictaphone when you are ready to dictate, since we have a limited number. Remember that your abstract will be read by other people and referenced back to the Institute, so resist the urge to be inflammatory.

4. Computation of alternative effect sizes. Many articles do not provide the information necessary to calculate a standardized mean difference effect size directly from the means and standard deviations. Therefore, alternative computational procedures have been suggested and are frequently used. Each of these alternative computational procedures makes different assumptions or ignores important information. We are interested in determining the degree to which these assumptions or use of alternative information alters the estimate of impact that will be derived. The best way to make this determination is to use the alternative forms of information that are available in the same article so that we have different estimates of the same parameter (i.e., impact of a particular project). A form is available that should be attached to your coding packet whenever alternative effect sizes can be calculated.

   For example, suppose for a particular article, you are able to compute an effect size using final status means and control group standard deviations. You should also compute the following alternative effect sizes when the necessary information is available:

   a. an effect size using final status scores and a pooled standard deviation.

   b. an ES using final status scores and the standard deviation given in the test manual.

   c. effect sizes using other information in the article such as F statistics, t statistics, and analysis of variance tables, proportional data, or exact probability levels.

   Whenever you can compute an effect size using some form of means and standard deviations, there are generally several other ways to compute such an effect size. The most preferable information to use is outlined in the conventions and is reproduced at the top of Figure 1. Figure 1 also shows for each way in which an effect size can be computed using means and standard deviations up to three alternative effect size measures using means and standard deviations which should also be computed. In many instances, you will not have the information necessary to compute all three of those suggested here.

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When available, however, all three additional effect sizes should be calculated. In addition to the alternative effect sizes using means and standard deviations, you should calculate as many as possible effect sizes from information such as t ratios, analysis of variance tables, proportions, etc. The possible sources of information are listed in Item VI-2 from the coding sheet, categories 4 through 13.

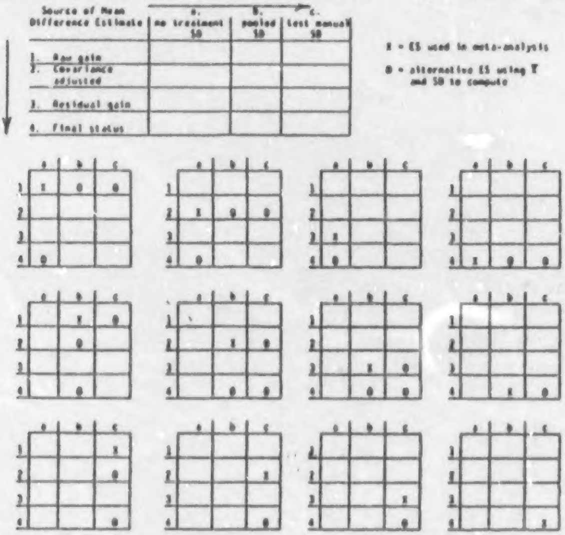
Source of Mean Difference Estimate
a. no treatment SD
b. pooled SD
c. test manual SD
1. Raw gain
2. Covariance adjusted
3. Residual gain
4. Final status
X = ES used in meta-analysis
0 = alternative ES using X̄ and SD to compute
a
b
c
1
2
3
4

Figure 1. Guide for determining which alternative forms of effect sizes to compute using means and standard deviations.

5. Clarification of Conventions. As coding proceeds, it will be important to clarify the major types of decisions which were made from the conventions. The conventions cannot possibly cover every instance, therefore, for each article you should note how conventions have been interpreted for the particular article you are coding for the major decisions which were not fit exactly by the conventions. An example of how this sheet should look is included in Figure 2. Follow this general format in writing your clarifications, be concise, and unless there are very unusual circumstances, do not include clarifications for more than five to 10 points for each article.

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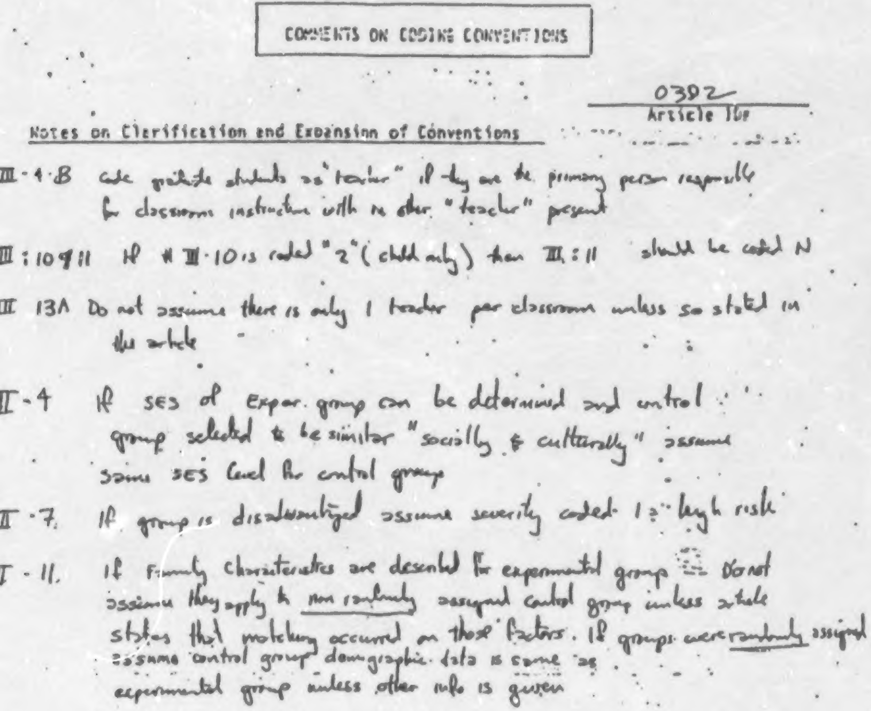
1. Whenever you are coding and have a question about how to compute an effect size, whether an effect size can be computed from the data you are given, how to interpret a particular convention, or whether an article is really appropriate for the meta-analysis, talk with Karl if he is available. If he is not available, check with at least one or two other people, make a note on the clarifications of conventions and proceed.



COMMENTS ON CODING CONVENTIONS

0392
Article ID#

Notes on Clarification and Expansion of Conventions

III - 4 · B code graduate students as "teacher" if they are the primary person responsible for classroom instruction with no other "teacher" present

III : 10 & 11 If # III · 10 is coded "2" (child only) then III : 11 should be coded N

III 13A Do not assume there is only 1 teacher per classroom unless so stated in the article

II - 4 If SES of Exper. group can be determined and control group selected to be similar "socially & culturally" assume same SES level for control group

II - 7. If group is disadvantaged assume severity coded 1 = high risk

I - 11. If Family characteristics are described for experimental group Do not assume they apply to non randomly assigned control group unless article states that matching occurred on those factors. If groups were randomly assigned assume control group demographic data is same as experimental group unless other info is given

Figure 2. Example of how Clarification of Coding Conventions sheet should be completed.

III. OBTAINING ADDITIONAL INFORMATION

There are several instances in which additional information will need to be obtained from authors or publishers. Form letters have been developed and are available from Marilyn for the following purposes.

1. Requesting a specific article (initial request, follow-up, and thank you).
2. Requesting additional articles, reports, or descriptions of a specific project (initial request, follow-up, and thank you).
3. Requesting information about means and standard deviations with reference to a specific article (initial request, follow-up, and thank you).

For each of these requests, a form or a postcard should be filled out indicating the specific information that needs to be inserted into the form letter. Copies of these forms are available in the coding room. At the top of each form is the space for the author's address or as much descriptive information as you can provide concerning the author. If you do not have a specific address or if the address you have is older than 1978, Lora will take the information which is available and go to the library to one of the directories of university faculty, APA membership, AERA membership, or AMA membership and try to find an accurate address. If she is unable to find a recent address but has an old address, she will send it to the old address. If she doesn't have an old address and is unable to find the address, the request will simply be filed, the requester will be informed, and we will proceed without that information. If Lora is able to find an address, she will give the form to Marilyn who will see that the letter is typed and a copy of the letter is put in the dated follow-up file. This follow-up file will work the same way as the follow-up file for requesting articles now in operation. After four weeks, an automatic follow-up request will be sent out to those from whom we have received no information. There will also be a thank you postcard available for each of the types of information which is obtained. Lora will also keep a file on the names and addresses of those people who have requested a copy of the executive summary of the meta-analysis findings. Whenever someone requests a copy of this summary, their name and address will be filed in this file and there should be a dissemination sheet completed for them which should be turned in to David Shearer.

IV. FLOW CHART OF CODING ACTIVITIES

Pictured on the next page is a flow chart of the most important activities which must occur during the coding process.

V. EIRI TEST MANUAL

Dennis has compiled a test manual which contains descriptions of the most frequently used tests which will be encountered in the meta-analysis. As we continue to code, this test manual will be updated and other tests will be added. For each test which is now included, there is a short description of

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the test, information concerning reliability, and norms (in some cases, for various subsamples of the norming population where this information was provided by the publisher or by other articles), and information concerning which subscales of the test should be coded as separate effect sizes if information is available. When an article provides information about subscales on a test, you should refer to the EIRI test manual before computing effect sizes for all of those subscales. In many instances, subscale scores should not be computed. Additional information is contained in the conventions about when to compute subscale scores and when not to. As you are coding articles and come across references to articles which probably provide information on the reliability or norms of a test which is being used to measure the impact of early intervention, this information should be given to Dennis so that he can decide whether to include information about the test in the manual. In addition, whenever you have questions about the nature or quality of the test which is being coded, those questions should be referred to Dennis first and, if he is not available, to Glendon. Pay particular attention to the testing threats which occur when an intervention program is developed using the same test items which are used at the end of the program to measure intervention effectiveness. For example, suppose for an IQ test that the specific items from that test are taken and developed into drill and practice routines, children are provided with drill and practice on those specific items, and then the test is given again. This would constitute a serious testing threat to the internal validity of the experiment. In many instances, the brief description of the test and the type of content contained in the test will allow you to make this decision.

VI. META-ANALYSIS STAFF MEETINGS

The meta-analysis staff will meet weekly (during Spring quarter, it will be every Tuesday from 11:00 to 12:00). Before the meeting, the following tasks should be completed:

A. Ben will review and copy all of the convention expansion clarifications for discussion by the entire group.

B. Ben will complete the computations for reliability checks which were completed during that week and provide this information to Karl.

C. Lora will note any problems staff are having in the way they are requesting articles, requesting information, or any of logistics of the coding process.

All of these information will be given to Karl who will then raise the important points during the staff meeting. In addition, we will use this time for inservice instruction in coding (discussing issues which have arisen during the previous week which are not sufficiently covered by the coding conventions and which might be problematic) and computation of effect sizes when means and standard deviations are not given. Everyone should make every effort to attend this staff meeting. With the number of people coding which we have, it is essential that we coordinate our work and this will be the only regular time during which this can occur. If you are unable to attend a meeting, it is your responsibility to find out what happened at the meeting and what assignments were made.

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Appendix 2-E

Coding System Used in the Meta-Analysis

Final 2/18/83

____
Coder/Date

META-ANALYSIS OF EARLY INTERVENTION

Coding Instrument

______________________ ______________________
(Author/Year) (Abbreviated Title)

I. INTRODUCTION

	ES1	ES2	ES3	ES4	
1-4					1. Study ID (----)
5-7					2. Effect Size (ES) # (---) (use 900 series for secondary effects)
8-9					3. Year (--)
10-13					4. Source (----)
14					5. Type of Comparison (1 = experimental vs. control; 2 = intervention A vs. intervention B; 3 = pre-post unadjusted; 4 = pre-post adjusted for norms; 5 = single subject design); 6 = intervention vs. placebo; 7 = placebo vs. control

___ 1. references needed from this article checked
___ 2. computations for ES shown
___ 3. every blank marked
___ 4. test names listed for ESs
___ 5. comments about conventions
___ ⑥ alternative ES computation
___ 7. article disposition sheet completed
___ 8. suggestions for future meta-analyses
___ ⑨ requests for additional information sent
___ 10. information to update test booklet given to Dennis
___ 11. information relevant to cost effectiveness noted and given to Glo
___ 12. enough raw data to compute medians and adjacent scores (write yes or no)
___ ⑬ description of intervention copied and attached
___ ⑭ abstract dictated
___ 15. ES checked by ________

Description of Comparison for Each ES

ES#___ ______________________

ES#___ ______________________

ES#___ ______________________

ES#___ ______________________

II. DESCRIPTION OF FINAL SAMPLES

	ES1	ES2	ES3	ES4	
					1. MEAN AGE at time outcome was measured (months)
15-17					Experimental (---.)
18-20					Control (---.)
					2. MEAN IQ (actual score) prior to intervention
21-23					Experimental (---.) ______ (test)
24-26					Control (---.) ______ (test)
					3. SIZE OF SAMPLE
27-32					Experimental (------)
33-38					Control (------)
					4. SES (1 = hi, 2 = middle, 3 = low, 4 = mixed)
39					Experimental
40					Control

______________________ (how SES determined)

Note: For all items, "-" should be used if the information cannot be determined; "9" should be used if the item is not applicable for the comparison being coded.

(1)

	ES1	ES2	ES3	ES4	
					5. SOURCE OF PARTICIPANTS (1 = parent initiated, 2 = solicited/volunteer, (3 = referred, 4 = captive, 5 = combination, 6 = other, specify ______)
41					Experimental
42					Control
					6. % MALE (---.)
43-45					Experimental
46-48					Control
					7. SEVERITY OF HANDICAP (1 = homogeneous at risk/disadvantaged, borderline, or mild, 2 = homogeneous moderate, 3 = homogeneous severe/profound, 4 = heterogeneous with at least 2 of the above)
49					Experimental
50					Control
					______ (CITE "ASSIGNMENT OF SOURCE OF SEVERITY INFORMATION")
					8. DESCRIPTION OF SAMPLE ACCORDING TO "HANDICAPS"
					A. Primary "Handicapping" Condition
51-52					Experimental
53-54					Control
					B. % of Sample with Primary "Handicap" (---.)
55-57					Experimental
58-60					Control
					C. Secondary "Handicapping" Condition
61-62					Experimental
63-64					Control
					D. % of Sample with Secondary or Other "Handicaps" (---.)
65-67					Experimental
68-70					Control
					9. % MINORITY IN SAMPLE
					A. % BLACK
71-73					Experimental (---.)
74-76					Control (---.)
(80)	1	1	1	1	CARD #1
					B. % HISPANIC
1-3					Experimental (---.)
4-6					Control (---.)
					C. % OTHER MINORITY (Native American, or other first generation immigrants)
7-9					Experimental (---.)
10-12					Control (---.)
					10. GEOGRAPHIC SETTING (1 = inner city; 2 = city/suburban; 3 = rural/remote based, 4 = mixed; okay to estimate)
13					Experimental
14					Control

0 = None
1 = Multihandicapped
2 = Hearing Impaired
3 = Visually Impaired
4 = MR
5 = Speech/Language Impaired
6 = Learning Disabled
7 = Orthopedically Impaired
8 = Other Health Impaired
9 = Emotionally Disturbed
10 = General Developmental Delay
11 = High Risk
12 = Disadvantaged
13 = Other ______ (specify)
14 = Combination

(2)

2-E2

	(1)	(2)	(3)	(4)	
					II. TARGET CHILD'S FAMILY CHARACTERISTICS
					A. % from one-parent homes
15-17					Experimental (---.)
18-20					Control (---.)
					B. % with father present in the home
21-23					Experimental (---.)
24-26					Control (---.)
					C. Average number of children in home (includes target child)
27-29					Experimental (--.-)
30-32					Control (--.-)
					D. Mothers: Average number of years schooling completed
33-35					Experimental (--.-)
36-38					Control (--.-)
					E. Fathers: Average number of years schooling completed
39-41					Experimental (--.-)
42-44					Control (--.-)

III. INTERVENTION

	(1)	(2)	(3)	(4)	
					① MEAN AGE of child at time intervention was initiated (months)
45-47					Experimental (---.)
48-50					Control (---.)
					② SETTING (1 = home based, 2 = classroom based, 3 = residential/hospital, 4 = doctor's office/clinic, 5 = other (indicate) ____ 6 = mixed (specify mix in percentages % ____ %)
51					Experimental
52					Control
					③ DEGREE TO WHICH INTERVENTION WAS "TAILORED" WITHIN THE SAMPLE BASED ON DIAGNOSTIC OR DEMOGRAPHIC INFORMATION (1 = no particular "tailoring" of intervention, 2 = intervention somewhat "tailored", 3 = intervention substantially "tailored")
53					Experimental
54					Control
					④ INVOLVEMENT OF VARIOUS INTERVENORS WITH CHILD (3 = only intervenor, 2 = major intervenor, 1 = minor intervenor, 0 = not an intervenor)
					A. Parent or Family Member
55					Experimental
56					Control
					B. Teacher - Professional
57					Experimental
58					Control

Note: In Section III, when it is an experimental control group or pre-post comparison, N should always be used in cells describing the control group. If it is an intervention A versus intervention B, a "-" or real number should be used for circled item numbers (do not use N). For item numbers without circles, N should be used if the component described in that total item was not an intended part of the treatment; otherwise a "-" or real number should be used.

					C. Aide, Tutor, or Assistant
59					Experimental
60					Control
					D. Support Service (i.e., PT, OT, Speech, Social Worker, Psychologist)
61					Experimental
62					Control
					E. Medical (MD, RN, Psychiatrist)
63					Experimental
64					Control
					F. Other
65					Experimental
66					Control
					① TRAINING OF PRIMARY INTERVENOR (1 = professionally certified for role and 24 hours+ training specific to program, 2 = professionally certified for role and no training specific to program, 3 = not professionally certified for role and 24 hours+ training specific to program, 4 = not professionally certified and no specific training for program)
67					Experimental
68					Control
					6. DURATION OF CHILD FOCUSED INTERVENTION
					A. AVERAGE HOURS of Child Focused Intervention PER WEEK (--.-)
69-71					Experimental
72-74					Control
(80)	2	2	2	2	End of [illegible]
					B. DURATION of Child Focused Intervention IN WEEKS (---.)
1-3					Experimental
4-6					Control
					C. TOTAL HOURS of Child Focused Intervention (----.)
7-10					Experimental
11-14					Control
					⑦ MODE OF INTERVENTION (1 = educational (includes speech), 2 = medical (includes drug, PT/OT), 3 = setting comparison, 4 = stimulation, 5 = diet, 6 = other, specify ______ (8A-C only apply to educational curricula)
15					Experimental
16					Control
					8. FOR EDUCATIONAL INTERVENTIONS
					A. WAS A SPECIFIC EDUCATIONAL CURRICULUM USED FOR MAJORITY OF INTERVENTION ACTIVITIES (more than 50%) (0 = No, 1 = Yes, specify)
17					Experimental ______
18					Control ______
					B. DEGREE OF STRUCTURE IN EDUCATIONAL CURRICULUM (1 = very structured, 2 = somewhat structured, 3 = not structured, 9 = no instructional intervention used)
19					Experimental
20					Control
					C. CONTROL OF INSTRUCTIONAL ACTIVITIES (choice and sequencing) (1 = mostly child controlled, 2 = mostly intervenor controlled)
21					Experimental
22					Control

5.0

	(1)	(2)	(3)	(4)	
					8. FOCUS OF EDUCATIONAL INTERVENTION 1 = language 2 = self-help 3 = motor 4 = social-emotional 5 = behavioral 6 = cognitive (pre academic) 7 = combination 8 = other--specify ______
23					Experimental
24					Control
					⑨ DID PROGRAM USE A STATED THEORETICAL APPROACH (0 = No, 1 = Yes, specify)
25					Experimental ______
26					Control ______
					⑩ TREATMENT DELIVERED TO: 1 = parent only, 2 = child only, 3 = parent & child together, 4 = parent & child separately, 5 = both parent and child but not clearly 3 or 4
27					Experimental
28					Control
					11. FOR PARENT TRAINING COMPONENTS
					A. AVERAGE HOURS OF PARENT TRAINING PER WEEK (--.-)
29-31					Experimental
32-34					Control
					B. DURATION OF PARENT TRAINING IN WEEKS (---.)
35-37					Experimental
38-40					Control
					C. TOTAL HOURS OF PARENT TRAINING (----.)
41-44					Experimental.
45-48					Control
					12. FOR "HOME-BASED" INTERVENTION COMPONENTS
					A. Average # of visits per month with parents or family to supervise/assist with home-based training (--.-)
49-51					Experimental
52-54					Control
					B. Average hours per month spent with parent or family member to supervise/assist with home-based training (--.-)
55-57					Experimental
58-60					Control
					C. Nature of Home-Based Program (1 = training "parents" as interventionists, 2 = home tutorial by nonfamily, 3 = material/toy lending, 4 = health/social service, 5 = combination
61					Experimental
62					Control
					D. Parents provided written description of weekly lesson activities (1 = yes, 0 = no)
63					Experimental
64					Control

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	#1	#2	#3	#4	
					13. FOR "CENTER BASED" INTERVENTION COMPONENTS
					A. Child/Intervener Ratio (--)
65-66					Experimental
67-68					Control
					B. Percentage of children who had previously been in a home based program (---.)
69-71					Experimental
72-74					Control
(80)	3	3	3	3	End of Card #3
					C. Degree of "target" child segregation (1 = target children--generally same type and severity, or one-to-one intervention, 2 = target children--other type and severity, 3 = integrated with non-handicapped, specify ratio of target to non-handicapped ________)
1					Experimental
2					Control
					④ DEGREE TO WHICH TREATMENT WAS IMPLEMENTED AS PLANNED (OK to estimate) (1= complete implementation, 2 = most of treatment implemented, 3 = only some parts implemented)
3					Experimental
4					Control
					⑤ INFORMATION SOURCE FOR CODING III - 14 (1 = data based, 2 = author's conclusion or inference, 3 = coder's conclusion)
5					Experimental
6					Control
					⑥ PRIOR FORMAL INTERVENTION HISTORY (1 = no prior intervention, 2 = yes, 1-6 mos.; 3 = yes, 7-12 mos.; 4 = yes, 13-24 mos. or more) If yes, specify type of intervention: ________)
7					Experimental
8					Control (this item should be coded even when Type of Comparison is not #2)
					⑦ DEGREE OF INTENDED PARENT/FAMILY INVOLVEMENT IN PROGRAM (1 = extensive, 2 = moderate, 3 = some, 4 = none)
9					Experimental
10					Control
					⑧ PARENT COMMITMENT/COOPERATION TOWARD INTERVENTION (1 = very positive, 2 = positive, 3 = ambivalent/negative)
11					Experimental
12					Control
13					⑨ FUNDING OF PROGRAM (1 = external funds for substantial portion, 2 = no or insignificant external funding, 3 = probably no external funding)
					⑩ CONTINUED INTERVENTION PROGRAM AFTER PRESCHOOL (0 = No, 1 = Yes, definitely) (Code only for outcome measures collected 6 mos. or more after intervention stops and children are 5 years or older)
14					Experimental
15					Control

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IV. DESIGN & REPORTING

	ES1	ES2	ES3	ES4	
16					1. TYPE 1 = random assignment 2 = non-random but appropriate matching on relevant variables 3 = convenience or poor matching 4 = pre-post, no control 5 = pre-post adjusted using means 6 = single subject/case study 7 = crossover 8 = other (specify) ____________________
					2. BLINDING OF DATA COLLECTOR (1 = yes definitely, 2 = yes probably (at least impartial), 3 = probably not, 4 = definitely not) (always code)
17					Experimental
18					Control
19					3. PRESENCE OF FACTORS WHICH UNDERESTIMATE EFFECTIVENESS OF EARLY INTERVENTION (0 = not a problem, 1 = minor underestimation, 2 = moderate underestimation, 3 = major underestimation)
					4. THREATS TO VALIDITY
20					A) Maturation
21					B) History
22					C) Testing
23					D) Instrumentation
24					E) Statistical Regression
25					F) Selection Bias
26					G) Experimental Mortality
27					H) Inappropriate Statistical Procedures
28					I) Description of Sample/Intervention/Analysis
29					J) Other (specify) ____________________
30					5. GENERAL INDEX OF VALIDITY (1 = high ⟷ 5 = low; come from convention)
					6. ADEQUACY OF DESCRIPTIVE INFORMATION PROVIDED ABOUT: (1 = complete information, 2 = somewhat sketchy, 3 = inadequate information)
31					A. Subject Variables
32					B. Intervention Procedures
33					C. Design and Analysis

Threats to validity codes:

0 = not a plausible threat to the study's internal validity
1 = potential minor problem in attributing the observed effect to the treatment; by itself, not likely to account for substantial portion of observed results
2 = plausible alternative explanation which by itself could account for substantial amount of the observed results
3 = by itself could explain most or all of the observed results

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ES # ____ ________________________________

ES # ____ ________________________________

ES # ____ ________________________________

ES # ____ ________________________________

(OUTCOME USED - TEST NAME(S))

	ES1	ES2	ES3	ES4
34				
35				
36				
37-38				
39				
40				
41				
42				
43				

V. OUTCOME

1. OUTCOME MEASURED FOR:

    1 = Target Child
    2 = Sibling of Target Child
    3 = Non-sibling Peer of Target Child
    4 = Parents

2. "TEST" ADMINISTERED TO: (1 = Individual, 2 = Group)

3. SCREENING MEASURE: (0 = No, 1 = Yes)

4. TYPE OF MEASURE

    1 = IQ Verbal
    2 = IQ Performance/Non-Verbal
    3 = IQ Full Scale/General IQ
    4 = Developmental Quotient
    5 = Fine Motor
    6 = Gross Motor
    7 = Motor Combined
    8 = Perceptual Organization
    9 = Expressive Language
    10 = Receptive Language
    11 = Articulation
    12 = Combined or Other Language not 9-11
    13 = Social Functioning/Adaptive Behav.
    14 = Interpersonal Interaction
    15 = ITPA
    16 = Preacademic/Academic
    17 = Psychological/Emotional Functioning
    18 = Self-Concept
    19 = Attitude
    20 = Parenting Skills
    21 = Health Status/Physical Growth
    22 = School Progress/Placement
    23 = Other (specify)

5. GENERALIZATION OF SKILL ACROSS PERSONS OR SETTINGS (1 = not a concern for this outcome; 2 = a concern, outcome assessed generalization well; 3 = a concern, outcome assessed generalization somewhat; 4 = a concern, but outcome did not assess generalization or assessed it poorly)

6. INSTRUMENT

    1 = Opinion by parent or untrained person or involved professional
    2 = Opinion by clinician, teacher, or trained professional (uninvolved)
    3 = Interview, rating, or questionnaire
    4 = Unstandardized objective measure
    5 = Systematic observation
    6 = Standardized objective measure
    7 = Physical measurement
    8 = Combination
    9 = Other, specify ________________________________

7. PRIMARY DATA COLLECTOR/INFORMANT (i.e., person making decisions about degree of growth mastery or level of functioning, e.g., IQ test = test administrator; interview with parent = parent)

    1 = Untrained paraprofessional or parent
    2 = Trained paraprofessional or parent
    3 = Professional but not likely to be trained by virtue of professional status
    4 = Professional specifically trained or likely to be trained by virtue of professional status

8. INSTRUMENT RELIABILITY (1 = .80 - 1.0, 2 = .79 - .60, 3 = .59 and below)
    Specify exact reliability ____________________

9. HOW r IS ESTIMATED (1 = reported in study for experimental population, 2 = test manual/literature, 3 = estimated with conventions)

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44 10. GENERAL QUALITY OF OUTCOME MEASURE (code from conventions)

45-47 11. MONTHS AFTER INTERVENTION INITIATED, OUTCOME WAS MEASURED

Experimental (---)

48-50 Control (---)

51-53 12. MONTHS AFTER INTERVENTION COMPLETED, OUTCOME WAS MEASURED

Experimental (---)

54-56 Control (---)

VI. CONCLUSIONS

57-61 1. Standardized Mean Difference Effect Size (±--.--)

62-63 2. Data from which Mean Difference ES was Calculated

1 = means and control group SD (code scale of means in item #3)
2 = means and pooled SD (code scale of means in item #3)
3 = means and published test SD (code scale of means in item #3)
4 = t ratio/F ratio from one-way ANOVA or exact probability
5 = t ratio from matched pairs, t test, or F ratio from mixed model ANOVA
6 = F of V table from n-way ANOVA
7 = S of V table from n-way ANCOVA or mixed model ANOVA
8 = ANCOVA F ratio
9 = non-parametric test statistic except chi squared
10 = probability estimate for t test or one-way ANOVA
11 = Regression lines
12 = Proportions ("probit" transformation)
13 = Chi square table
14 = Other ____________________
(specify)

64 3. Scale of Mean Difference for ES (if #2 coded 1, 2, or 3, code from 1-4 below)

1 = Raw gain scores
2 = residual gain scores
3 = covariance adjusted scores
4 = final status measure
5 = other (specify) ____________________
6 = if #2 was coded 4-14

65-67 4. Variance Effect Size ($S_E \div S_C$) (-.--)

68 5. Author's Conclusions (0 = not considered, 1 = intervention appears to work, 2 = data equivocal about intervention effectiveness, 3 = intervention appears not to work)

69 6. Country of Study (if not USA, specify)

1 = USA
2 = English-speaking non-USA ____________________
3 = non-English speaking, Europe
4 = non-English speaking, North, Central, or South America ____________
5 = Other ____________________

70 7. Profession of Researcher/Designer (1 = Education, 2 = Special Education, 3 = Psychology, 4 = Medical (MD only), 5 = Physical Therapy, 6 = Occupational Therapy, 7 = Speech Therapy, 8 = Nutrition, 9 = Social Work, 10 = Other ____________________)

80 4 4 4 4 End of [illegible]

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ACCURACY OF ESTIMATING ES

Columns					
(1-4)					Study ID#
(5-7)					Effect Size # from Original Coding
(8-11)					1. Effect Size (±.--) used in meta-analysis
(12-13)					2. Source of ES
					3. Alternative ES #1 using Means and S.D.
(14-17)					A. Effect Size ±.--
(18-19)					B. Source of ES
					4. Alternative ES #2 using means and S.D.
(20-23)					A. Effect Size ±.--
(24-25)					B. Source of ES
					5. Alternative ES #3 using means and S.D.
(26-29)					A. Effect Size ±.--
(30-31)					B. Source of ES
(32-35)					6. Effect Size calculated from t-ratio or F ratio from one-way ANOVA or exact probability (±.--)
(36-39)					7. Effect Size calculated from t-ratio from matched pairs t-test, or F ratio from repeated measures or other mixed model or split plot ANOVA design (±.--)
(40-43)					8. Effect Size calculated from S of V table from n-way ANOVA (±.--)
(44-47)					9. Effect Size calculated from S of V table from ANCOVA, repeated measures, or other complex ANOVA design (±.--)
(48-51)					10. Effect Size calculated from ANCOVA F ratio
(52-55)					11. Effect Size calculated from nonparametric test statistic except chi-square (±.--)
(56-59)					12. Effect Size calculated from probability estimate for t-test or one-way ANOVA (±.--)
(60-63)					13. Effect Size calculated from regression lines (±.--)
(64-67)					14. Effect Size calculated from proportion ("probit" transformation)(±.--)
(68-71)					15. Effect Size calculated from visual inspection of graphical data
(72-75)					16. Other, specify

Source of Effect Size
for Alternatives Using $\bar{X}$ and SD

11 = means and control groups SD, raw gain score
12 = means and control groups SD, covariance adjusted scores
13 = means and control groups SD, residual gain scores
14 = means and control groups SD, final status
21 = means and pooled SD, raw gain score
22 = means and pooled SD, covariance adjusted scores
23 = means and pooled SD, residual gain score
24 = means and pooled SD, final status
31 = means and published test SD, raw gain scores
32 = means and published test SD, covariance adjusted scores
33 = means and published test SD, residual gain scores
34 = means and published test SD, final status
40 = t-ratio or F ratio from one-way ANOVA or exact probability
42 = t-ratio from matched pairs t-test, or F ratio from repeated measures or other mixed model or split plot ANOVA design
44 = S of V table from n-way ANOVA
46 = S of V table from ANCOVA, repeated measures, or other complex ANOVA design
48 = ANCOVA F ratio
50 = nonparametric test statistic except chi-square
55 = probability estimate for t-test or one-way ANOVA
60 = regression lines
65 = proportion "probit" transformation
70 = visual inspection of graphical data
75 = other

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COMPUTATION OF ALTERNATIVE EFFECT SIZES

320

Article ID #

2-E.7

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DESCRIPTORS/GUIDELINES FOR ANNOTATED BIBLIOGRAPHY

1) Author/Year/ID# ______________________________

2) Handicapping Condition

___ 1. Multi-handicapped
___ 2. Hearing impaired
___ 3. Visually impaired
___ 4. MR
___ 5. Speech/language impaired
___ 6. Learning disabled
___ 7. Orthopedically impaired
___ 8. Other health impaired
___ 9. Emotionally disturbed
___ 10. General developmental delay
___ 11. High risk (medically, genetically)
___ 12. Disadvantaged (economically, culturally, socially)

3) Severity

___ 1. At risk = homogeneous
___ 2. Borderline mild = homogeneous
___ 3. Moderate = homogeneous
___ 4. Severe/profound = homogeneous
___ 5. Heterogeneous

4) Type of Article

___ 1. Review
___ 2. Research
___ 3. Assessment
___ 4. Philosophy

5) Delivery System

___ 1. Home
___ 2. Center
___ 3. Combined

6) Age Intervention Began

___ 1. 0-2½
___ 2. 2½-5
___ 3. Combined

7) Parents Used as Major Intervenor

___ 1. Yes
___ 2. No

8) Mode of Intervention

___ 1. Educational
___ 2. Medical
___ 3. Setting change
___ 4. Stimulation
___ 5. Diet
___ 6. Other

9) Long-Term Impact Discussed

___ 1. Yes
___ 2. No

10) Cost-Effectiveness Discussed

___ 1. Yes
___ 2. No

For research articles, describe briefly (150-word maximum)

- type of intervention
- sample description
- type of design
- dependent measures
- results (in ES if possible; if not, whatever is best)

COMPUTATION OF EFFECT SIZES.

___ Article ID #

Standardized Mean Difference Effect Sizes	Variance Effect Sizes
ES# ___	
ES# ___	
ES# ___	
ES# ___	

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Article ID#

Notes on Clarification and Expansion of Conventions

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____
Article ID# (ie., the article you are now coding)

ARTICLES APPROPRIATE FOR FUTURE MINI META-ANALYSES

1. Professional vs. Paraprofessional Service Delivery
2. The effects of early intervention on handicapped/non-handicapped interaction
3. Measurement/Instrumentation Issues
4. Effects of early intervention on siblings or family functioning
5. Psychophysiological factors/changes resulting from or facilitating cognitive activity/development (both animal and human)
6. What factors contribute to or detract from successful parent intervention?
7. Stability of IQ measures over time
8. Reviews for future analysis
9. Cost effectiveness of early intervention
10. Factors influencing parent-child bonding and interaction
11. Prenatal and perinatal influences on infant behavior and cognitive/physical development
12. The development of social skills among handicapped preschoolers
13. Language intervention with preschool handicapped children (list here for Bev Mystie's meta-analysis and also include in our meta-analysis)
14. Relation of parent IQ to intervention effectiveness
15. Communication patterns between handicapped preschoolers and parents, siblings, or peers
16. The efficacy of vestibular stimulation

Appendix 2-F

Meta-Analysis Conventions and Computational Formula

Final Revision: 4/15/83

META-ANALYSIS OF EARLY INTERVENTION

CONVENTIONS

Contained in this document are the conventions or basic rules for coding the early intervention research articles. Additional examples of how these basic rules have been applied are contained in the conventions notebook. While coding articles, these rules should be used to make most decisions. If information is unavailable, the item should be coded "-". If an item does not apply to the particular comparison being considered, code it "N".

Occasionally, educated guesses are possible. For example, a study may report that 100 mentally retarded children were randomly assigned to one of two groups and give descriptive information for the experimental group (e.g., mean IQ, percent male, SES level), but not for the control group. In this case, since the samples are relatively large and randomly assigned, it would be acceptable to assume (or "guess") that the control group has the same demographic characteristics even though they are not reported. When guesses or interpretations not covered specifically by the basic conventions are made, include a brief explanation on the "comments on conventions" page so the example can be incorporated into the conventions notebook. Guesses should be the exception rather than the rule and should only be made when you are confident about the accuracy. For a few items, as noted specifically on the coding sheet, you can be more liberal about guessing. In general, however, if in doubt about whether or not to estimate--don't.

GENERAL CODING CONVENTIONS

1. Code with a #2 pencil.

2. Try to code each document in one sitting.

3. Use "N" whenever the variable is "not applicable". Use "-" for "impossible to determine" or "missing data". Use zero only as a real number. Every cell in a utilized column of the coding sheet must have data, the "not applicable" code or the "missing data" code.

4. Be sure to fill in all digits, include the decimal point whenever there is a number to the right of it. Including leading zeros is not necessary since keypunchers will right justify all information.

5. Varying types of duration or intensity measures may be reported in the article, e.g., hours/day; days/week; months/year. In converting from reported data to information needed on the coding sheet, use 1 month = 4.3 weeks. Note that if converting to or from units/year, the number of months the program operates should be used. For example, if the coding calls for hours per week and the study reports 120 hours a year and a 10-month program, then hours per week = ([120 ÷ 10] ÷ 4.3) = 2.8.

6. Duration coding--if the posttest took place during treatment, duration should be measured from pretest or beginning of treatment to posttest. If posttest administered after treatment, duration should be measured up to treatment termination. If article reports only information in quotes below, make the following assumptions:

   "full year" = "school year" = 9 months
   "half day" = 3 hours
   "full day" = 6 hours
   "biweekly" or "bimonthly" = twice a week or month

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7. If the variable is an "average", compute the weighted average whenever possible. For instance, if the variable is the average number of home visits, and the document indicates all parents received 3 and 20% received 4 or 5, the weighted average would be computed as follows:

$$\text{Weighted average} = \frac{80(3) + 20\left(\frac{4+5}{2}\right)}{100} = 3.3$$

8. If a variable calls for the average value (such as mean age of subjects) and the range is reported, record the midpoint of the range. If the report says the range was from X_1 to X_4, but most were between X_2 and X_3, record your best guestimate of mean age (if range is 3 to 7, but most are 3 to 5, a reasonable guestimate would be about 4.7). Note that the midpoint of 3 to 5 is midpoint of 3.0 to 5.99 which is 4.5 and not 4.0.

9. All documents reporting analysis of the same data base should be coded as a single "study". A "study" includes, for example, all interim reports, reports on different topics or reports using different analytic perspectives (including secondary analysis). As long as a document reports data on the same group(s) of children, it is part of the same study. If you are coding a document which seems to be related to another document but is not so identified, see Karl.

10. A separate column or "Effect Size" is computed for three different categories of information. First, whenever relevant outcome information is provided for different outcome variables as described on item V-4. For example, if the article provides information on IQ, receptive language, and parental attitude, three different Effect Sizes should be computed utilizing columns 1, 2, and 3. In this case, all other information associated with those Effect Sizes would be identical except information in Section V and Section VI. If the article provides outcome information about the same type of measure (e.g., IQ) using two different instruments (e.g., Stanford-Binet and WISC), you should compute two different Effect Sizes using two columns and note on p. 8 of the coding sheet the different tests being used. Secondly, separate Effect Sizes should also be computed for different subsamples of the sample which is described. For example, if the article provides information about experimental and control groups' IQs for boys and girls separately, you should compute a standardized mean effect size for boys and a standardized mean effect size for girls. In this case, there is no need to compute a total group standardized mean effect size since that information will simply be the weighted average of the preceding two Effect Sizes. A third dimension which will create additional Effect Sizes is if the outcome is measured over time. For example, if a nine-month treatment occurs after which the outcome is measured and then another test is given one year later and another test one year after that, you should compute three Effect Sizes. Do not generally compute more than one Effect Size per measure per year even though more tests may be administered. For example, consider an 18-month center-based program in which Bayley Developmental Scales are administered every 3 months. In this case, you should compute one effect size at the end of 12 months and another effect size at the end of the program (i.e., 1 effect size for each year or portion of the year for which you have tests administered). Generally, it will be unusual to compute more than 20 Effect Sizes per article. If you are coding an article where you think more Effect Sizes than this should be generated, see Karl.

I. INTRODUCTION

1. Study ID# - should be recorded on the upper right-hand corner of the article--if it is not, talk with Lora.

2. Effect Size (ES) # - Record the sequential # of the effect size for which information will be recorded in that column. Every column for a particular study should have a unique ES#.

3. Year - year of publication. If not given, estimate by adding 1 year to the latest citation in the references. Code only the last two digits.

4. Source - the specific source or journal name where the article was published or obtained; coded from list of sources on the following page.

5. Type of Comparison - Record the type of comparison for the particular ES about which information is being recorded in that column. If two types of comparison are possible for the same group of subjects, e.g., pre/post and experimental/control group, record only the methodologically most sound unless the weaker comparison includes additional information (e.g., % of sample which is male) in which case, record both using separate columns.

   Children should be considered to be in a control group if they are in the most naturally occurring setting with no special activities, instruction, or treatment. Anytime a child is placed in an "unnatural" setting, it should be regarded as a type of intervention regardless of the presence or absence of particular therapies or instructional procedures, unless the "unnatural" setting can be considered a "placebo" for an experimental treatment. For example, a child placed in an institution is in an intervention even if no special therapy is given because it is an "unnatural" setting. A child who stays at home with no explicit instructional, therapeutic, or training procedure given to parent or child is in a control setting for purposes of coding regardless of the terminology used by the author. However, consider 30 children who are in an institution. Fifteen are assigned to each of two groups with group #1 receiving an experimental treatment and group #2 remaining in the institution with normal day-to-day management. This should be coded experimental-control (#1).

   The code "4 = pre-post, adjusted for norms" should be used whenever a pre-post effect size must be computed but you have a test available for which age-appropriate norms were used for both the pretest and the posttest so that maturation effects are controlled for. For example, a child who is at the 45th percentile on the Bayley at 12 months according to 12-month-old norms and at the 55th percentile at 24 months according to 24-month-old norms would have increased 10 percentile points. Age-appropriate norms can be reported in percentiles, standard scores (including WISC-R and Stanford-Binet IQ), or ratio IQ scores.

LIST OF SOURCES

0011	Academic Therapy
1013	Allied Health and Behavioral Sciences
1015	American Academy of Child Psychiatry Journal
0017	American Academy for Education of Severe and Profoundly Handicapped Review [illegible]
1019	American Journal of Diseases of Children
0021	American Journal of Mental Deficiency
1022	American Journal of Occupational Therapy
1023	American Journal of Orthopsychiatry
1025	American Journal of Psychiatry
1027	American Journal of Child Psychology, Psychiatry, and Allied Disciplines
0029	American Journal of Psychology
1031	American Medical Association Archives of Neurology and Psychiatry
1033	American Medical Association Journal of Diseases of Children
0035	American Montessori Society Bulletin
0037	American Practitioner and Digest of Treatment
0039	Annals of the New York Academy of Sciences
1041	Archives of General Psychiatry
1043	Australian and New Zealand Journal of Psychiatry
0045	Behavior Research and Therapy
0047	Behavior Therapy
1049	British Journal of Psychiatry
0051	British Journal of Psychology
1053	British Medical Journal
1055	Bulletin of the Psychonomic Society
1057	Canadian Medical Association Journal
1059	Canadian Psychiatric Association Journal
0140	Canadian Journal of Behavioral Sciences
0061	Child Behavior Therapy
0063	Child Development
0065	Child Psychiatry and Human Development
0066	Children
0067	Children Today
0069	Child Welfare
1071	Clinical Pediatrics
0073	Cognition
1075	Cognitive Psychology
0077	Community Mental Health Journal
1079	Comprehensive Psychiatry
0081	Current Therapeutic Research
1083	Delaware Medical Journal
1085	Developmental Medicine and Child Neurology
0087	Developmental Psychology
0089	Developmental Psychobiology
1091	Diseases of the Nervous System
1093	Drug Therapy
0094	Early Childhood Development and Care
0095	Education and Treatment of Children
1097	Epilepsia
0099	Exceptional Children
0100	Genetic Psychology Monographs
0101	Harvard Educational Review
0103	Human Development
1105	Illinois Medical Journal
1107	International Journal of Neuropsychiatry
1109	International Journal of Pharmacopsychiatry
0111	Journal of Abnormal Child Psychology
0113	Journal of Abnormal Psychology
0115	Journal of Autism and Childhood Schizophrenia
1117	Journal of the American Academy of Child Psychiatry
1119	Journal of the American Medical Association
0121	Journal of Applied Behavior Analysis
1123	Journal of Behavioral Therapy and Experimental Psychiatry
0125	Journal of Child Language
1127	Journal of Child Psychology and Psychiatry
1129	Journal of Clinical and Experimental Psychopathology and Quarterly Review of Psychiatry and Neurology
1131	Journal of Clinical Endocrinology
0133	Journal of Clinical Investigation
0135	Journal of Clinical Psychology
0137	Journal of Community Psychology
0139	Journal of Consulting and Clinical Psychology
0141	Journal of Consulting Psychology
0143	Journal of the Division of Early Childhood
0144	Journal of Experimental Education
0145	Journal of Educational Psychology
0147	Journal of Educational Research
0149	Journal of Experimental Analysis of Behavior
0151	Journal of Experimental Child Psychology
0153	Journal of Experimental Research
0155	Journal of Genetic Psychology
0157	Journal of Learning Disabilities
1159	Journal of the Maine Medical Association
0160	Journal of Mental Deficiency Research
0161	Journal of Mental Science
0163	Journal of Music Therapy
1165	Journal of the National Medical Association
0167	Journal of Negro Education
1169	Journal of Nervous and Mental Disease
1170	Journal of Pediatric Psychology
1171	Journal of Pediatrics
0173	Journal of Personality
0175	Journal of School Health
0177	Journal of School Psychology
0179	Journal of Sociology
0181	Journal of Special Education
0183	Journal of Special Education Technology
0185	Journal of Verbal Learning and Verbal Behavior
0187	Lancet
1189	Medical Journal of Australia
1191	Medical Neurology
1192	Mental Hygiene
0193	Mental Retardation
0195	Merrill Palmer Quarterly
1196	Michigan Medicine
1197	Neurology
1199	New England Journal of Medicine
1200	New York State Journal of Medicine
1202	Nursing Research
1203	Pediatrics
0205	Perceptual and Motor Skills
1207	Pharmacology Biochemistry and Behavior
0209	Physical Therapy
1211	Psychiatric Quarterly
0212	Psychological Monographs
0213	Psychological Record
0215	Psychological Reports
0217	Psychology in the Schools
0219	Psychology Today
1221	Psychopharmacologia
1223	Psychopharmacology
1225	Psychopharmacology Bulletin
1227	Psychophysiology
1229	Psychosomatic Medicine
1231	Psychosomatics
0233	Research Quarterly
0235	Review of Educational Research
1236	Royal Society of Health Bulletin
0237	Science
1239	Southern Medical Journal
0241	Training School Bulletin
1243	Western Medicine
0245	Young Children
3000	Book (published by established commercial publisher, including university presses)
4000	ERIC document (but not 3000, 5000, or 7000)
5000	*Dissertation/Thesis
7000	Government Funded Project Report
8000	Other Unpublished

II. DESCRIPTION OF FINAL SAMPLES[1]

For any article with relatively large groups ($n_i > 30$) or for demographic characteristics which apply to more than 25% of the group, if the article describes the experimental sample on a demographic characteristic and says that subjects were randomly assigned to experimental and control groups, assume that the control group sample exhibits the same demographic characteristics. If the article describes demographic characteristics for the experimental group and says that groups were matched on those characteristics, code both experimental and control groups the same unless more specific information is given. For example, if the article provides information on SES for the experimental group and says that a control group was used which was socially and culturally comparable, then SES should be coded the same for the control group.

If 1-5 (Type of Comparison) is coded "1" (experimental vs. control), or "2" (Intervention A vs. Intervention B), or "6" or "7", all boxes for the control group on coded comparisons in this section should have a number or "-". N should generally be used for the control group information if 1-5 was coded "3", "4", or "5".

1. Mean Age at time outcome was measured.

   - Report in months

   - If rounding is necessary, .5 or greater round up, below .5 round down.

   When grade in school is given but no specific age, assume average child at beginning of kindergarten is 66 months (5.5 years) and at end of kindergarten is 75 months. Use these ages for anchor to estimate other average ages based on grade placement when ages are not given.

2. Mean IQ

   - Report actual IQ score if given. If range only is reported, use midpoint as best estimate. If article reports how many in each sample are in the various MR severity levels, use the following numbers to estimate the mean IQ for the sample: Normal = 100, Dull Bright or Borderline = 78, EMR = 63, TMR = 48, Severe = 33, Profound = 18. If article reports only that sample is Down Syndrome, do not estimate. If article reports only that children are MR, do not estimate. If article reports that children are only hearing impaired/visually impaired, or some other handicapping condition not generally associated with MR, do not estimate. If article provides "IQ like" information (PPVT, Draw-A-Man, etc.) prior to intervention but no true IQ score, use the "IQ-like" information for this item.

3. Size of Sample - Number of subjects at time data was analyzed.

---

[1] For all items in Section II, assume subject mortality is proportional unless otherwise stated. In other words, compute the percentages in each group at the beginning and don't change the percentage as a result of subject mortality unless the article specifically states how many were lost from each group. An exception to this rule is when any demographic characteristic accounts for less than 33% of the sample before attrition and attrition is more than 20%. In those cases, code the item "-". For example, if in a sample of 40 children, there are 10% of the children which are Hispanic and attrition is 33% but the article does not state from which ethnic groups children were lost, this item should be coded "-".

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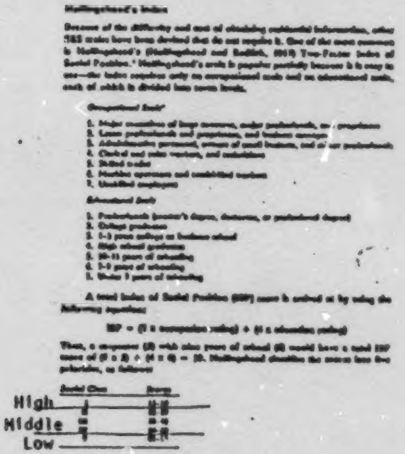
4. Socioeconomic Status (SES) - Specify how SES was determined on coding sheet. Examples: Low SES would be Title I recipients, Head Start participants, inner city children, or low income subjects. Middle SES would be blue collar, or lower management families, high SES would be children of university professors, doctors, or upper management. Code as 4 = mixed if the group contains a mixture of SES (i.e., a heterogeneous group) with at least 10% of the sample in two different groups. If article states that subjects were low, middle, or high without determining how it was determined, use author's statement. Use the following as a guide in determining SES level.


High
Middle
Low

From: Hopkins & Stanley. Educational and psychological measurement and evaluation (6th ed.). Englewood Cliffs, N.J.: Prentice Hall, 1981.

2-F.4

5. Source of Participants

1 = parent initiated - parents of target child sought out intervention without any formal or specific advertisement or recruitment on the part of the program. For example, the parent may contact a doctor's office or other medical agency or a school for handicapped children to request help for a child whom they suspect is developmentally delayed.

2 = solicited/volunteer - subjects for a particular intervention are obtained in response to a specific recruitment campaign for that particular project. Such recruitment may be either written, word of mouth, or other media.

3 = referred - subjects are obtained either through current participants in the program referring the agency to other people with similar situations or referring their associates to the agency, or by other agency people (e.g., doctors) referring relevant subjects back to the program being considered.

4 = captive - subjects are currently enrolled in a program which is then used to try a particular type of intervention, or subjects are residents of an institution which decides to implement an experimental program. This code should be used whenever subjects or their families have very little or no control over whether or not they will participate in the intervention program.

5 = combination - whenever fewer than 90% of the total sample is in one of the above categories. For example, if 15% of the sample was parent initiated and 85% of the sample was referred, it should be coded combination.

This item refers to the source of participants for a particular intervention treatment. Some children at the ECC are referred from doctors, some result from parent initiation, some are solicited from the community. The question being coded in this item is not how they came to the ECC but how they ended up in a particular intervention program. If the education unit decided to try a new biofeedback program and took all children who were in a center-based preschool program, this should be coded "4 = captive". If they send a letter home to parents asking which of them would like to have their children participate in the program, this should be coded "2 = solicited". If they ask Seh to recommend children he thought would benefit particularly from such a program, then it should be coded "3 = referred".

Be careful about concluding that the particular program being coded is like other programs with whom you have had contact in terms of source of participants. For example, it is not justified to conclude that since most children in the Exceptional Child Center's preschool program are referred, that children in other preschool programs operated by university centers are also referred, unless the article specifically states that.

6. % Male - Percentage of male subjects at the time of the posttest.

7. Severity of Handicap

1 = homogeneous at risk, disadvantaged, borderline, or mild
2 = homogeneous moderate
3 = homogeneous severe/profound
4 = heterogeneous with at least 2 of the above

Guidelines for determining severity are provided below by handicapping conditions. Be sure to be familiar with the definitions of the handicapping conditions in Item II-8. Use "4" (heterogeneous) when 90% or less of the sample is one level of severity and 10% or more of the sample is a different level of severity.

List the source of information used to determine severity level (e.g., IQ, DQ, adaptive behavior measure, or dB), or indicate if estimate was based on author's description. Do not assume that Down Syndrome children should be coded "2 = homogeneous moderate" unless the article gives that information specifically.

SPECIFIC GUIDELINES BY SEVERITY

Handicap Type	1 = Homogeneous Borderline/Mild	2 = Homogeneous Moderate	3 = Homogeneous Severe/Profound
Multihandicapped			All multihandicapped children should be considered severe/profound.
Hearing Impaired	27-55 dB	56-70 dB	Over 71 dB, "deaf".
Visually Impaired	20/100 or less "visually limited"	20/100 - 20/200 "low vision"	20/200 or less corrected "blind"
Mentally Retarded	IQ = 55 - 85 "educable"	IQ = 40 - 54 "trainable"	IQ below 40
Speech-Language Impaired	40-50% delay. A 2.0 year old child with receptive language at 1.0 level is 50% delayed.	55-69% delay	70% or more delay
Learning Disabled	40-54% delay in one area. A child at grade 1.0 who is reading at 3.0 is 25% delayed.	55-69% delay in one area or 40% delay in two areas.	70% or more delay in one area or 40% delay in more than two areas.
Orthopedically Impaired	Less than 3 SD's below the mean on relevant measures.	3-4 SD's below the mean.	More than 4 SD's below the mean.
Other Health Impairments	Less than 3 SD's below the mean on relevant measures.	3-4 SD's below the mean.	More than 4 SD's below the mean.
Emotionally Disturbed	Less than 3 SD's below the mean on relevant measures.	3-4 SD's below the mean.	More than 4 SD's below the mean.
General Developmentally Delayed	Less than 3 SD's below the mean on relevant measures.	3-4 SD's below the mean.	More than 4 SD's below the mean.

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8. Description of Sample According to Handicaps

A. Primary Handicapping Condition
B. % of Sample with Primary Handicapping Condition
C. Secondary Handicapping Condition
D. % of Sample with Secondary or Other Handicapping Condition

Using the categories defined below, record the percentage of the sample which exhibits the primary handicapping condition targeted by the intervention. For example, if the intervention is designed to test the efficacy of a particular type of home-based physical therapy for cerebral palsy children, then orthopedically impaired should be coded as the primary handicapping condition even though 80% of the children are also MR. In this case, MR should be noted as the secondary handicapping condition. Note: On coding "D", you should include the percentage of children having the secondary handicapping condition noted in 8-C in addition to any other handicapping conditions. For example, in a sample of 20 children, all of whom are CP, 10 of whom are mentally retarded, 1 visually impaired, and 3 hearing impaired, 8-D should be coded 70% (10 + 1 + 3) ÷ 20 = .70, and 8-C should be coded "4 = MR" to indicate that MR is the most predominant secondary handicapping condition. Do not include under the coding for secondary handicapping condition conditions which are almost always associated with a particular handicap. For example, virtually all profoundly hearing impaired children also exhibit speech impairments. A profoundly deaf sample should not be described with a secondary handicapping condition of speech/language impaired since this is a generally accepted concomitant condition with profound deafness. Avoid using "14" = combination unless it is impossible to identify a predominant primary or secondary handicap.

0 = None - Use to code secondary handicapping condition item (8C) when 100% of the sample displays the primary handicapping condition and/or there is no secondary handicapping condition.

1 = Multihandicapped - concomitant impairments (such as mentally retarded-blind, mentally retarded-orthopedically impaired, etc.), the combination of which causes such severe educational problems that they cannot be accommodated in special education programs solely for one of the impairments. Include deaf blind in this category. Do not include handicapped children whose only second handicap is a mild speech or language impairment, or disadvantaged/high risk children who are also MR, or hearing impaired, or orthopedically impaired, etc.

2 = Hearing Impaired - a hearing impairment which is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, which adversely affects educational performance.

3 = Visually Impaired - a visual impairment which, even with correction, adversely affects a child's educational performance. The term includes both partially seeing and blind children.

4 = Mentally Retarded - significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period, which adversely affects a child's educational performance. Do not include autistic children in this category. If article states that all children were Down Syndrome, assume they are also all MR (depending on severity, some may be coded multihandicapped instead of MR). If IQ is in MR range and adaptive behavior is not mentioned, assume sample is still MR.

5 = Speech/Language Impaired - a communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, which adversely affects a child's educational performance. Do not include in this category if primary handicapping condition is hearing impairment, autism, or cerebral palsy.

6 = Learning Disabled - a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, or of environmental, cultural, or economic disadvantage.

7 = Orthopedically Impaired - a severe orthopedic impairment which adversely affects a child's educational performance. The term includes impairments caused by congenital anomaly (e.g., clubfoot, absence of some member, etc.), impairments caused by disease (e.g., poliomyelitis, bone tuberculosis, etc.), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns which cause contractures).

8 = Other Health Impaired - limited strength, vitality or alertness, due to chronic or acute health problems such as a heart condition, tuberculosis, rheumatic fever, nephritis, asthma, sickle cell anemia, hemophilia, epilepsy, lead poisoning, leukemia, or diabetes, which adversely affects a child's educational performance.

9 = Emotionally Disturbed - exhibiting one or more of the following characteristics over a long period of time and to a marked degree, which adversely affects educational performance: an inability to learn which cannot be explained by intellectual, sensory, or health factors; an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; inappropriate types of behavior or feelings under normal circumstances; a general pervasive mood of unhappiness or depression; or a tendency to develop physical symptoms or fears associated with personal or school problems. Includes children who are schizophrenic or autistic. The term does not include children who are socially maladjusted, unless it is determined that they are seriously emotionally disturbed. Children referred to as hyperactive, hyperkinetic, or Attentional Deficit Disorder (ADD) should be included in this category.

10 = General Developmental Delay - this is usually used with very young children who have delays in more than one area of development, e.g., language, motor, cognitive, social-emotional, self-help. It is used when other labels are not clear-cut and definitive. Do not use as secondary handicap.

11 = High Risk - includes only children determined to be at risk of being or becoming handicapped because of medical (e.g., low birth weight, perinatal trauma), or genetic (e.g., mother MR) reasons. Do not use as secondary handicap.

12 = Disadvantaged - subjects from poverty, culturally or socially disadvantaged settings. Do not use as secondary handicap.

13 = Other. If children in a sample exhibit a handicapping condition which is not clearly included in one of the above codes, code it as "Other" and specify the particular kind of handicapping condition. Before using this code, see Glendon or Karl to make sure the handicap does not fit in one of the existing codes.

14 = Combination

9. % Minority in Sample

Code the percent of the sample which fall into each of the following minority groups. Do not assume that all children in the sample are from the particular minority group which is associated with a specific city. For example, it would be erroneous to assume that an intervention population in inner city Atlanta was 100% Black, or that a sample from Albuquerque, New Mexico was 100% Hispanic, unless that information is given in the article.

A. % Black - percentage of children in sample at time of posttest who are Black.

B. % Hispanic - percentage of children in sample at time of posttest who are Hispanic (includes Mexican-American, Puerto Rican, Cuban, etc.). Assume Spanish bilingual programs are 100% Hispanic.

C. % Other Minority - percentage of children in sample at time of posttest who are Native American, Southeast Asian, or other minority group (particularly where English is a second language) other than Black or Hispanic where minority group membership might be related to intervention success.

10. Geographic Setting:

1 = inner city - sample population drawn from "core, inner city" of a metropolitan area having at least 100,000 inhabitants. Note: The determining factor here is not that the intervention took place in an area having more than 100,000 inhabitants but rather that the participants came from the "core, inner city" of an area having at least 100,000 inhabitants.

2 = city/suburban - sample population drawn from city or suburban area with 10,000-100,000 inhabitants.

3 = rural/remote - sample drawn from rural/remote area which is more than 45 minutes normal travel time to a city with more than 10,000 inhabitants.

4 = mixed - if sample population is not predominantly drawn from one of the above defined locations but includes subjects from 2 or more.

Code this item "2 = city/suburban" unless the article gives specific information which convinces you to code it "1", "3", or "4". If author refers to sample as rural or inner city and gives no other information, use the author's definition. To be considered a mixed geographic setting, at least 10% of the sample must be in each of two groups.

II. Target Child's Family Characteristics

A. Percentage from one-parent homes: percentage of sample at time of posttest where either the father or mother is not present in the home.
B. Percentage with father present in the home: percentage of sample at time of posttest with the father present in the home.
C. Average number of children in home: average number of children living in the home of the target child--includes the target child and counts siblings and non-siblings.
D. Mothers: average number of years schooling completed. Do not count kindergarten (e.g., if article states that the average amount of schooling was eighth grade, it should be coded 8.0). If the article states that the highest grade completed was xxx, use xxx minus 25% of xxx as estimate of code (e.g., if highest grade completed in the sample was eighth, article should be coded 6.0 = (8 - [.25 (8)]).
E. Fathers: average number of years schooling completed--code same as II-D above. If information is given only for "parents", assume both mother and father have the same amount of education and use the same number for II-D and II-E. If information is given only for mother, do not assume anything for father and vice versa.

III. INTERVENTION

If #1-5 is coded "1" (experimental vs. control), "3" (pre-post unadjusted), "4" (pre-post adjusted), or "5" (single subject design), the control group box for all items in this section should generally be coded "N". If #1-5 is coded "2" (intervention A vs. intervention B), the control group box for all items in this section should have a number or "-". There are some instances of experimental A vs. experimental B comparisons where "N" is appropriate. These are noted below.

1. Mean Age of Child at Time Intervention Was Initiated (months) - record the age of the child at the time the intervention program was begun. Precise ages are not as important here, so if you can be accurate to within + or - 3 months, estimate. If the article states that intervention was begun when all of the children were infants, estimate 3 months. If the article states immediately after birth, estimate 0 months. Assume children begin kindergarten at 66 months and use this as an anchor point for other estimations. Do not estimate unless you are confident that the estimation is within + or - 3 months.

2. Setting refers to setting where the target child received intervention. "Intervention" is defined as any planned set of activities, instruction, or environmental change which is intended to produce gains in one of the outcome domains defined in Section V.

    1 = Intervention is delivered only in home setting, including foster home.
    2 = Intervention is delivered only in nonresidential "center-based" settings (including Head Start, public school, day care, university, state social services agency).
    3 = Intervention delivered in any residential institution, hospital, etc.
    4 = "Outpatient" services delivered in a doctor's office, clinic, or other center. This includes children who attend a center defined in #2, but only for speech or physical therapy and do not participate in a total educational program.
    5 = Other

6 = Intervention is delivered in home- and center-based programs. In this case, "center" includes intervention delivered in any of the settings defined by codes 2, 3, or 4. Estimate percentage of time per week on the average intervention is delivered in the home and in the center, e.g., Home = 75%/Center = 25% would be coded for a program in which 15 hrs/week was in the home and 5 hrs/week was in the Center.

If 90% of the intervention is delivered in a "center" (codes 2, 3, or 4), then the intervention should be considered a center-based program. To be considered a home-based program (i.e., coded as either 1 or 6), specific components of the intervention totaling more than 10% of the total intervention must be delivered at home. Typical parent communication and PR activities such as parent-teacher conferences, tours of the facility, notes to parents informing them what the school did this week, etc. should not be considered as a home-based component of a program.

3. Degree to Which Intervention Was "Tailored" Within the Sample Based on Diagnostic or Demographic Information

1 = No particular "tailoring" of intervention.
2 = Intervention somewhat "tailored" to unique needs of different individuals.
3 = Intervention substantially "tailored" to needs of different individuals.

Refers to the degree to which the intervention is different for individual children based on demographic or diagnostic information. For example, do all children receive basically the same curriculum materials in the same sequence, or is the curriculum and sequence adjusted depending on each child's current level of performance, type of handicapping condition, etc. An intervention which is child-directed where the particular intervention experience the child receives may be very different from what other children receive, but these differences result from child decisions when the same materials are available to all should be coded "1", even though the nature of each intervention may be different. Do not confuse this item with item III:8-B which codes the degree of structure in the curriculum. This item refers only to the degree to which the intervenor is making curriculum/sequencing/therapeutic decisions based on the unique needs and/or perceived level of functioning of the child. This item should be coded "2" if some of the intervention but less than half of it is determined based on some assessment or diagnosis of individual children. If more than half of the intervention is structured as a result of individual assessment diagnosis, it should be coded "3".

4. Involvement of Various Intervenors with Child.

For each of the categories (A-F), note whether people in that category had sole, major, minor, or no involvement with the child in the intervention program. Do not include administrative, supervisory, or training activities in determining a person's involvement with intervention. Consider the following examples to represent "only intervenor" status: 1) a teacher conducts a center-based program which parents visit occasionally but no structured programs are given to parents and there are no formal expectations for them to assist with the intervention; 2) a parent is trained in how to deliver intervention and receives supervision and "inservice training" but no one else actually works with the child. To be considered a "major intervenor", a category of persons must have contact with the target child 25% or more of the total intervention time. A "minor intervenor" would have contact with the child less than 24% of the total intervention time. To be considered a "minor intervenor", there must be some expectation for the person to perform specific intervention-related tasks on the part of the major intervenor. In addition, to be considered a "minor intervenor", persons in each of the intervenor categories must participate in a minimum total amount of the intervention as defined below.

A. Parent or Family Member: 10%
B. Teacher: 10%
C. Aide, Tutor, or Assistant: 20%
D. Support Service: No minimum percentage as long as it is a structured role with expectations.
E. Medical: 10%
F. Other: 10%

For example, a parent who accompanies the child occasionally to a center-based intervention program would not be considered a minor intervenor unless the teacher of that program has specific expectations for the parent to be involved in the program, there is some indication that the parent meets those expectations, and the parent's role constitutes at least 10% of the total intervention. In other words, it is not sufficient to say that the parent was present during various intervention sessions and consequently may have modeled some of the teaching behaviors in the home even though there was no specific expectation for that home teaching. If any of the categories are coded "3 = only intervenor", all other categories should be coded "0". There can only be one category coded "2 = major intervenor". In other words, you must decide which category is the primary intervenor. Other categories participating in the intervention according to the guidelines above should be coded "1 = minor intervenor". If two categories share total time of intervention equally, code as the major intervenor that category which has primary responsibility for planning or supervising the intervention activities. A teacher (category B) is defined as any professional person who is not a parent or family member who has primary responsibility for a child or group of children in an intervention program. In other words, a graduate student might be a teacher in one program if they are the person with primary responsibility, but may be coded as an assistant in another program where they are working under the direction of a head teacher.

5. Training of Intervenors

1 = professionally certified for role and 24 hours+ training. For this item, the 24 hours+ training refers to training specific to the intervention program being implemented. This item would be coded, for example, when a teacher is the primary intervenor with the Portage Program and has attended at least a three-day workshop or three days worth of inservice training on using the Portage materials.

2 = professionally certified for role and no training specific to program. This item would be coded if in the above situation the teacher was simply provided with the Portage training materials but there was no structured inservice training or workshop associated with it. The teacher read the materials, perhaps including a teacher's guide, and then implemented them.

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3 = not professional certified for role, 24 hours+ training to program. This item should be coded when a paraprofessional or parent is the primary intervenor but they have been given at least 24 hours of training specifically in how to implement that particular intervention program. A parent who has completed a Portage workshop for at least three days on how to implement the program would be counted in this category.

4 = not professionally certified and no specific training for program. Any parent, aide, or graduate assistant who has not received at least three days of specific training for the program being implemented.

Do not estimate information for this item. In other words, do not assume that all Head Start teachers are certified teachers because the teachers with whom you worked in Head Start were mostly certified. Do not assume parents do not have any training unless that information is contained in the article. For most programs, the area in which professional certification is needed will be clear (e.g., educational programs need teachers, medical programs need doctors or nurses, physical therapy programs need physical therapists). However, in a few instances, it may not be as clear. For example, a vestibular stimulation program does not require a great deal of training in physical therapy to be correctly implemented. In such cases, however, you should still require that a person be professionally certified by the discipline which generally implements such intervention programs before coding it a "1" or a "2".

6. Duration of Child Focused Intervention

A. Average Hours of Child Focused Intervention Per Week

Only include activities which directly involve the child in intervention activities. For example, a child may be in a hospital 24 hours/day for 6 days and receive therapy for 1/2 hour/day. This item should be coded 3.0, not 144.0 (6 X 24). Be very careful about estimating in the absence of explicit information because even small errors can seriously distort the total when they are magnified over a long time period. For example, a 10-week program might easily involve 60 hours of intervention (2 hours/day x 3 days/week) to 400 hours of intervention (8 hours/day x 5 days/week). Because both levels of intensity are reported in the literature, it would be unacceptable to estimate by saying that a "typical" kindergarten runs for 4 hours/day. Unless more specific information is given, this item should be coded blank. Do not estimate how much time parents spend each day in a home instructional program unless such information is given. Also, do not estimate the amount of home-based intervention if the article reports only information such as parents were expected to work with their child daily. Note that for home-based programs, you are coding the intended time of intervention. If the article states that parents were expected to work with their child for 30 minutes each day five days a week, you should record 2.5 hours per week and then also code under Item III-16 the degree to which the treatment was implemented as planned. If the article states that parents work with their children daily, assume that parents work with their children for 5 days a week unless other information is given.

B. Duration of Child Focused Intervention in Weeks

Only count time child is actually in the specific setting. Assume that a "full year" program is 9 months long with 4.3 weeks/month unless specified otherwise. Assume non-university center-based programs are on vacation for 2 weeks at Christmas and 1 week at Easter, unless otherwise specified.

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Assume university center-based programs are on vacation 2 weeks at Christmas, 1 week at Easter and 3 other weeks between September 1 and June 1. Assume home-based programs do not function in the absence of some type of supervision or monitoring unless reported otherwise. For example, if a home-based program functions from September 1, 1977 to May 30, 1979 but parents receive no assistance or supervision during the summer of 1978 (June 1 - August 31), that would be a 77-week program (18 months x 4.3 weeks/month = 77.4) and not a 90-week program (21 months X 4.3 weeks/ month = 90.3).

C. Total Hours of Child Focused Intervention in Weeks

Information for this item will be computed using the information recorded in items III:6-A and III:6-B and follows the basic conventions outlined above for determining # of hours.

7. Mode of Intervention

1 = Educational - intervention is aimed at developing those cognitive, linguistic, social/emotional, or physical/motor skills necessary for optimal societal adjustment (including school performance). Intervention may also be aimed at skills which come as logical precursors to those skills mandatory to societal adjustment. To be considered an educational intervention, the program must include activities such as vocabulary development, letter identification, number identification, matching, manipulatives, or the mastery of other cognitive-related skills and concepts which are obvious precursors to academic tasks such as reading, arithmetic, writing, or language. Virtually all early intervention programs are designed to impact at some point on the child's educational performance. However, they should not be considered in this category unless they meet the guidelines above. Speech/therapy programs should be considered as educational intervention.

2 = Medical - any drug or therapeutic intervention designed specifically to ameliorate or facilitate the physical health, functioning, or well being of the child except for interventions coded as "4" below. Include in this category occupational therapy or physical therapy programs.

3 = Setting Change - the movement of the child from one milieu to another, or a substantial change of the child's milieu without an accompanying educational, medical, or therapeutic intervention.

4 = Stimulation - the deliberate exaggeration (amount or frequency) of sensory stimuli or stimuli to other physical modalities such as the vestibular canals. This category should only be coded when the primary focus of the intervention is stimulation for the sake of stimulation, and not when stimulation occurs as a natural by-product of some educational intervention. Interventions will usually only be coded in this category when the target child is an infant or functioning at the developmental level of an infant. These interventions are primarily environmental enrichments such as stroking babies, flashing lights, vestibular stimulation, surrounding the child with various sounds, etc. Obviously, every intervention component involves stimulation of some type. If you are in doubt about whether to code an intervention as stimulation or one of the other five categories, see Karl.

5 = Diet - a deliberate adjustment of food intake in order to ameliorate or facilitate a physical or nonphysical condition.

6 = Other - Doman-Delacato or other types of "sensory integration" therapies should be coded in this category and a specific note made describing the type of therapy.

Items III:8-A - III:8-D should only be coded if III-8 was coded "1 = educational". Even though 8A-8D could be construed to apply to some medical and stimulation therapies, do not code for anything but educational intervention without checking with Karl.

8. For Educational Interventions

A. Was a Specific Educational Curriculum Used for Majority of Intervention Activities?

Record the name(s) of any specific curriculum which is used for majority of intervention activities. This includes commercially available and other standardized curricula. For example, Portage is now commercially available, but before it was was marketed it was still a specifically defined standardized curriculum. To be considered a primary curriculum, it must be used for 80% or more of the intervention program. Use the following guidelines in coding.

An educational intervention should be considered a specific curriculum if it contains a scope and sequence of instructional activities and is available in a written, self-contained form. A professional intervenor should be able to implement the program based on the information in the package, with only minimal outside training. An intervention procedure which is explained in great detail and is very replicable may or may not be a curriculum according to this definition.

B. Degree of Structure in Curriculum

1 = Very Structured - 50% or more of the intervention must be based on a detailed set of outcome objectives supported by a task analysis with scripted presentation of activities and procedures and criteria for progressing to new material.
2 = Somewhat Structured: 50% or more of the intervention must be organized around preconceived activities which is based on explicit scope and sequence of learning. The relation of various parts of the curriculum should be specified and there should be the intention for interventionists to follow a preconceived, organized plan of instruction.
3 = Not Structured: any intervention which does not meet the criteria for 1 or 2 above.

If part of the program is very structured and part of it is not, code the item "-" unless one degree "structure" accounts for 80% or more of the total program.

C. Control of Instructional Activities

1 = Mostly child controlled - should be coded whenever the child's decisions (as opposed to symptoms or current level of functioning) are the major factor in determining the content or sequence of the intervention. This includes situations in which after the learning environment has been organized by the teacher or intervenor with appropriate materials and experiences available to the child, the child then exercises his/her own volition in selecting and interacting with these materials.
2 = Mostly intervenor controlled - not only does the teacher select and control the materials available to the child, but s/he also outlines the sequence and mode of usage. The intervenor makes decisions

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regarding pacing, selection of activities for a certain session, when to begin and end. For this item, the word "teacher" includes parents, assistants, support personnel, or any other person involved in directing intervention activities.

D. Focus of "Educational" Intervention

For each treatment group in an educational intervention, specify which of the following is most descriptive of the total program. In comparisons of a true experiment and control group, the control group should be coded "N". Do not code this item unless it is an educational intervention without first checking with Karl.

1 = Language - Expressive and receptive language skills (listening, speaking, writing, signing) or articulation. Vocabulary development.
2 = Self-Help/O.T. - Health/hygiene, eating, grooming, housekeeping, (daily living), dressing, toileting.
3 = Motor/P.T. - Fine and gross motor skills, physical fitness, visual-perceptual skills, body awareness and posture; sensorimotor.
4 = Social-Emotional - Self-concept, social skills, peer and adult interaction strategies.
5 = Behavioral - Discipline problems, disruptive behavior, self-abusive/injurious behavior.
6 = Cognitive (pre-academic) - Development of skills necessary for acquisition of reading, math, and functional literacy. Will generally include letter and number recognition, matching and identification exercies, following directions, word games, etc.
7 = Combination of 2 or more of the above as major foci of intervention.
8 = Other--specify ____

9. Did Program Use a Stated Theoretical Approach: If the article refers to a particular theoretical approach or type of curriculum upon which the intervention was based, code this item "1 = Yes" and specify the particular type of theoretical approach utilized. Examples of such theoretical approaches include Piagetian, Direct Instruction, Doman Delacato, Gesell, Operant Conditioning, etc. Be as specific as you can be in a short amount of space in providing specifics about the theoretical approach. Also, remember to copy and attach to your coding sheet for later analyses copies of the pages in the article which describe the intervention and the theoretical basis upon which it is built, if any.

10. Treatment Delivered to:

1 = parent only
2 = child only
3 = parent and child together
4 = parent and child separately
5 = both parent and child but not clearly 3 or 4

Rule A: If both parent and child receive any amount of intervention from program personnel, go to Rule B. If not, code either #1 or #2.

Rule B: If parent and child are together 15% or more of either child intervention time or parent intervention time, code #3. Otherwise, code #4.

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Example 1: In a stimulation program for blind infants, parents receive 4 hrs/week lecture and bring their child in for 1 hr/week during which they practice certain techniques. It is assumed that the child receives some direct attention by program personnel. Code #3 because for 100% of intervention with the child, parent and child were together.

Example 2: In a similar program, parents receive 4 hrs/week lecture while the infants are in an intervention program nursery. For 30 minutes per week, they are seen together. Code #4 because the time parent and child were together was less than 15% of either child or parent intervention time.

In Section III: Intervention, there are several items which provide information about specific components of an intervention. If an intervention does not intend to include that component at all, items related to those components should be marked "N". For example, an intervention treatment which does not include any parent training should be coded "N" and not 0. Items in Section III to which this rule always applies include items 6 and 7 (child-focused intervention); in cases where the total intervention is focused only on the parents, items 11 through 13 (parent training); where the intervention does not plan to provide any home-based training, item 14 ("home-based" intervention components); and where no "center-based" intervention is intended, item 15 ("center-based" intervention components).

11. For Parent Training Components

A. Average Hours of Parent Training Per Week

Parent training consists of any intervention activities which are designed to increase the parent's ability to assist their child in making developmental progress, better cope with having a handicapped child, better access services for assisting their handicapped child, become better informed about the nature of the handicapping condition or their children's expected development, or other activities which are intended to directly or indirectly prevent, ameliorate, or eliminate a handicapping condition in their child. Assume all parents attended all formal training sessions unless other information is given in the article. Do not count time parents spend delivering home-based services as parent training time. Although they may become better interventionists during this time as a result of practice, this should be considered service delivery and not parent training.

B. Duration of Parent Training in Weeks

Code the number of weeks from the beginning of parent training to end of parent training in which some formal training occurred each month. In other words, if parents had a monthly workshop for 12 months, this should be coded 52 weeks. If parents had workshops once each week for 4 months and then one workshop a week for 3 weeks, this should be coded 20 weeks (4.3 X 4 + 3 = 20.2). If, however, parents had a monthly workshop for 3 months and then had no activity for 3 months at which time they had a monthly workshop for 3 more months, this should be coded 26 weeks (4.3 weeks X 6 months). Do not count any time in which at least one training activity per month did not occur.

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C. Total Hours of Parent Training

Estimate as near as you can the total hours of parent training which occurred. Note: This will not be a strict computation of 11 and 12 because parent training frequently does not occur on a regular basis as noted in Item III-12.

12. For "Home-Based" Intervention Components

Information in this item should be coded for any component of any intervention program which is conducted in the home as opposed to some type of "center". The primary intervenor in such settings will often be a parent, sibling, or other family member assisted by a teacher, speech therapist, nurse, or other professional or paraprofessional person.

A. Average Number of Visits Per Month with Parents or Family to Supervise/Assist with Home-Based Training - code the average number of times per month over the duration of the intervention period in which agency personnel were in the home of the family to supervise/assist with home-based training. Do not count visits which parents made to the center or telephone or written contact made with the parents. To be counted as a visit, agency personnel must be physically present in the child's home.

B. Average Hours Per Month Spent with Parents or Family Member to Supervise/Assist with Home-Based Training - code the average hours per month over the duration of the project which agency personnel spent in the home to assist with home-based training. Assume that a "brief visit" is 1/2-hour long if no other information is given. If article states only that periodic visits were made, leave this item blank. If the article states that a one-hour visit was made to each home weekly for the first three months of the program and no visits were made for the remainder of the program and the program lasted 9 months, the item should be coded for 1 hour X 4.3 weeks X 3 months = 13 hours ÷ 9 months = 1.4. In other words, the information asked for is the average hours per month spread over the life of the intervention program.

C. Nature of the Home-Based Program

1 = Parent training - the parent is trained as an intervention agent by the home teacher. The parent implements systematic educational intervention activities (including language, PT, OT, cognitive) with their child.
2 = Home tutorial - the home teacher visits the home and implements systematic intervention activities with the child. The parent may or may not be present during the activities.
3 = Material/toy library - parents are provided with materials, toys or activities to implement with their child. These could be accompanied by activity guides, phone follow-up or home visits. Primary emphasis is on provision of material instead of a systematic set of educational or therapeutic intervention procedures.
4 = Health/social service intervention - parents and/or children are visited by a nurse or social worker or trained in accessing health/social services. The purpose of the program is for assistance in noneducational activities such as nutrition, child care, child development.
5 = Combination - any program which involves major portions (i.e., 25% or more of the total intervention program) of two or more of the above.

D. Did parents have written program describing weekly lesson activities?

1 = Yes - Code if article describes a written program which is provided to parents which describes the activities they are supposed to do with their children each week. To be considered a written program, it must describe at least 80% of all activities parents are supposed to conduct with their children.
0 = No - If no mention is made of a written program being provided, code this item "No".

13. For Center-Based Intervention Components

A. Child/Intervenor Ratio (--): List the number of children per intervenor in the treatment location over the course of the intervention. For example, if a program for 10 children has 1 teacher all day and 1 aide for 1/2 day, the ratio is 10 to 1.5 = 7, not 10 to 2 = 5. Although a program may be designed to provide individualized instruction, how many children are present with the intervention agent(s) at a given time?

B. Percentage of children receiving prior home-based intervention (---): Percentage of children in the treatment program who participated in a home-based intervention program prior to the center-based intervention being coded in this comparison.

C. Degree of "target" child segregation:

This item codes information about the degree to which the intervention took place in a homogeneous group of handicapped children, versus a heterogeneous group of handicapped children, versus a heterogeneous group of handicapped and nonhandicapped children. In other words, it is asking a question about the degree to which the intervention occurred in a mainstreamed or nonmainstreamed setting. The following information should be used to code.

1 = Target children--generally same type and severity - Homogeneous group of "handicapped" children all with same type and severity of handicap together in the treatment program. Includes programs which provide one-to-one intervention, because in those settings children are segregated from other children.
2 = Target children, various types and severity - Heterogeneous group of "handicapped" children with different types of severity of handicap together in the treatment program.
3 = Integrated with nonhandicapped - Heterogenous group of "handicapped"/nonhandicapped children together in the treatment program. The ratio of handicapped to nonhandicapped should be filled in if the information is given.

14. Degree to Which Treatment Was Implemented as Planned

In most cases, little information will be provided about this item. Because of Item 15 below, it is okay to estimate when no information is given. Some number should always be coded for this item.

1 = Total experimental treatment implemented as planned: From the perspective of a critical project director, was almost everything implemented as he/she would have hoped? Programs which are well laid out with adequate supervision and are appropriately focused, or where

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very little extraordinary is expected from the intervention agent in terms of skills and/or commitment, are most likely to be implemented as planned. For example, an intervention of routine, physical therapy provided in a hospital setting by hospital staff already trained to do those functions and with some supervision would probably be implemented as planned.

2 = Most of the experimental treatment implemented as planned: Although there were some weaknesses in the way the implementation occurred and numerous areas in which improvement could be made, there is a clear difference between the interventions received by the experimental group and a control group. For example, in a home-based program, it may have been intended that parents would be trained so they could be as good an implementor as the trainers. They may never have reached this level of proficiency; however, they were clearly delivering services which were different from what a typical parent would be giving their child. Interventions which require extraordinary levels of commitment or particularly complex training regimens should generally be coded in this category unless other specific information is given.

3 = Only some parts of experimental treatment implemented as planned: To be coded "3", there may still be differences between the experimental and control group but there are major problems with the implementation so that this particular test of the implementation is not a fair test of that intervention strategy. For example, if parents were intended to deliver one hour per day of home-based intervention but there is evidence to suggest that children only received an average of 1.7 hours per week, this would be a major problem with the intervention. The degree to which an intervention calls for skills or commitment which is not present in the intervenor population or that the treatment is a very complex treatment without necessary supervision or assistance will contribute to problems in this area.

In some studies, they will have data suggesting how well the treatment is implemented. In other cases, you will need to make judgments based on your perceptions of the complexity and realistic nature of implementing the treatment as planned. In some cases, you would judge from the "tone" of the article. In all cases, however, you should make the judgment and code this item "1", "2", or "3". Protection for making bad guesses is provided in Item 15 below.

15. Information Source for Coding III-14.

1 = Adequate data presented in article to support coding of III-16.
2 = Author's conclusion or implication but not adequately supported by data.
3 = Coder's conclusion based on potential or reported difficulties of treatment implementation, amount of supervision given, and tone of article.

16. Prior Formal Intervention History

Information in this item refers to intervention received by target children prior to intervention which is being described in the article being coded. If the article states that the intervention is being carried out with infants shortly after birth, assume that they had no prior intervention; otherwise, require definite information before coding.

2-F.12

1 = Definitely no
3 = Yes, 1-6 mos.
4 = yes, 7-12 mos.
5 = yes, 13 mos. or more

This item should be coded for the control group even when type of comparison is not #2. When the type of design is a pre-post design, this item would be "not applicable" in the cell labeled control.

17. Degree of Intended Parent/Family Involvement in Program: Listed below are four categories of intended family involvement. Remember, this item is coding what was intended by the program developers, not what actually happened. For each of the four categories, descriptions are given. Use the criteria in each of the categories for a general guide and include the code in that category if most of the criteria for that category are met.

1 = Extensive: For classroom programs, parents are expected to volunteer in the classroom on a weekly basis and parents are included in planning and evaluating classroom activities. The classroom teacher provides carryover activities weekly for parents to implement in the home. For home-based programs, parents are eventually given responsibility for the planning, development, and delivery of intervention activities. The parent acts as the child's instructor a minimum of 5 days a week, implementing the planned intervention activities. The parent is expected to record their child's progress in intervention activities. Both: Parents are invited to participate in program planning and evaluation activities. The program involves parents in planning and provides monthly inservice training and parent support meetings. Parents are active participants in developing their child's intervention program.

2 = Moderate: For classroom programs, parents are expected to volunteer in the classroom on a monthly or bimonthly basis. The teacher provides the parents with carryover activities to implement in the home on at least a monthly basis. For home-based programs, the parent must serve as the child's instructor a minimum of 5 days a week implementing the planned intervention activities. The parent is expected to record their child's daily progress on intervention activities. Both: The program provides regular inservice training and parent support meetings. Parents are invited to review and make comments on their child's planned intervention program.

3 = Some: For classroom programs, parents volunteer in the classroom 3-4 times a year. Parents are provided with quarterly newsletters or general/generic carryover activities. For home-based programs, the parent is presented activities during the home visit with the option of implementing them during the week, but primary home-based intervention is done by someone else. Both: The program provides general inservice training and occasional parent support groups.

4 = None: The parents are not involved in any aspect of the program. The home-based program is a tutorial and there is no expectation that parents become involved.

18. Parent/Family Commitment/Cooperation Toward Intervention

1 = Very Positive: Parent implements weekly intervention activities with their children, parents volunteer regularly in the classroom or program activities, parents attend and actively participate in parent training, parent meetings, and program planning and evaluation. These activities are implemented consistently with 80% or more of the parents.

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2 = Positive: Parent participates in one or two of the following activities on a regular basis (at least 50% of the parents)
- implementing weekly classrooms or home-based intervention activities with their children.
- parents volunteer regularly in the classroom or program activities.
- parents attend and participate in parent training, parent meetings, and program planning and evaluation.

3 = Ambivalent/Negative: Parents do not participate in program activities other than mandatory activities. Program personnel often have a difficult time getting parents to participate in mandatory program activities. Article states that substantial number of parents were reticent to be involved or did not complete activities.

19. Funding of Program

1 = External funds for substantial portion - Use this convention for those intervention programs where more than 50% of the funds come from federal or foundation sources. Unless there is clear evidence to the contrary, whenever an article acknowledges the contribution of a source of funds (e.g., this project was supported by HCEEP Grant #XXX), this code should be used.

2 = No or insignificant external funding - Use this convention where more than 50% of the funds come from state and local resources, e.g., state education funds, social service funds, local funds, etc.

3 = Probably no external funding - Use this code when there is no specific mention of external funds and it is not clear that there was no external funding.

This item should always have a number, i.e., it should not be left blank.

20. Continued Intervention Program After Preschool (0 = no, 1 = yes, definitely)

This item should be coded "N" for both experimental and control groups, except in those cases where an outcome measure is collected 6 months or more after the intervention stops, and children are 5 years old or older. For example, you would code this item either "0", "1", or "-" if an early intervention program were conducted for children between 0 and 3 years of age and an IQ measure for children in the experimental and control groups was collected when the children were 8 years old. This item is designed to collect information about the conclusion of some reviewers that early intervention programs are only effective if there is a systematic deliberate program delivered to children in their regular education which is compatible with the original early intervention program.

IV. DESIGN

1. Type

1 = Random assignment - Subjects are randomly assigned to groups. When subjects are matched first on some variable(s) and then randomly assigned to groups, it should still be considered random assignment.

2 = Non-Random but appropriate matching on relevant variables - Not randomly assigned to groups but control subjects were matched to experimental subjects in such a way that it is very likely that there was less than 1/4 S.D. difference between the groups before intervention began on variables which were used as outcome measure.

AVAILABLE

3 = Convenience or poor matching - Basis for selecting subjects was that they were available or matching criteria and procedures did not meet criteria outlined above.
4 = Pre-post, no control - Estimate of impact is based on differences between pre and posttest scores on some outcome. There is no control group available and pre and posttest scores are not age-adjusted by referencing to norms.
5 = Pre-post adjusted - Estimate of impact is based on differences in age-adjusted norms between pre and posttest. To be counted in this category, the test must provide norm-referenced scores which are within 2 months of being appropriate for 90% or more of the children in the sample. For example, if the Bayley Scales were used in a pre and posttest setting with a group of children who average 12 months old at the beginning and 24 months old at the end, and scores are reported as standard scores or percentile scores using the appropriate norms for each child, the difference between pre and posttest scores would be an appropriate measure of outcome for this category since the Bayley provides norms at 3-month intervals. This category can only be used when norms are provided with the age of child being used in the intervention. Most IQ measures would be included in this category. It does not apply when gains are reported in raw scores rather than percentiles or some other type of standard score.
6 = Single subject - Data are presented as a graphic display of subject responses over time with estimates of impact coming from differences between baseline periods and intervention periods in either an "ABA" type or "multiple baseline" type of design.
7 = Crossover - At beginning of experiment, part of the experimental group assigned to treatment condition(s) and part to control (or placebo) condition(s). After a time dependent measures are gathered for members of each group and treatment and control conditions are "crossed over". After a time, dependent measures are gathered again. This process is repeated until dependent measures are gathered for all members of experimental group as they are exposed to all conditions.
8 = Other - Any other design. Specify design on coding sheet.

2. Blinding

1 = Yes - Individual definitely blind. Article states that data collectors were blind or gives information from which you can determine it.
2 = Probably - Individual was not told the purpose of the study and/or what subjects were under what conditions but very possibly could have figured it out, or the article states that testers were impartial or independent but does not specifically state that they were blind.
3 = Probably not - Article does not give any information about "blinding" of testers. Since "blinding" is recognized as such a positive procedure, we assume they probably would mention it had they done it.
4 = No - Individual definitely was not blind.

3. Presence of Factors which Underestimate Effectiveness of Early Intervention

As described in the Campbell and Boruch article, there are numerous situations in which an estimate of early intervention effectiveness might be underestimated when quasi-experimental designs are used. Most of these factors stem from a control group being used which is more highly functioning than the experimental group at the beginning of the intervention program. When this happens, the following factors may lead to underestimations of the program impact.

BEST

a. Systematic underadjustment for pre-existing differences because of inadequacies in analysis of covariance adjustment procedures or regression toward the mean.

b. Differential growth rates among populations functioning at different levels, increases in reliability with age, and lower reliability in the more disadvantaged or lower functioning group. In addition, test floor and ceiling effects and what Campbell and Boruch referred to as grouping feedback effects (where the lower functioning group associates with other children who are low functioning and the control group or higher functioning group associates with other children who are higher functioning, thus contributing to exaggerating the differences between the groups).

The first four factors only occur when the control group is substantially higher functioning than the experimental group. As Campbell and Boruch pointed out, even though statistical adjustments were made in these situations, those adjustments will frequently underadjust. This item should be coded on a 0-3 scale indicating the degree to which factors are present which tend to underestimate the effectiveness of early intervention. In one sense, this is a coding of the degree to which the groups are divergent to begin with on the outcome variable, or variables related to the outcome variable with the control group being the higher functioning group. This should be coded "0" if it is not a problem, "1" if some minor underestimation might occur (minor being defined as a tenth of a standard deviation or less, "2" if moderate underestimation might occur (moderate being defined as a tenth of a standard deviation to .67 standard deviations), and "3" major underestimation (major underestimation being described as more than .67 standard deviation). The degree of underestimation can be estimated to some degree from the severity of test floor and/or ceiling effects and regression towards the mean. Ceiling and floor effects will not generally be serious unless the effects are widely disparate for the experimental and control groups. Estimations due to differential growth rates increases in reliability with age, or lower reliability in the disadvantaged group are much more complex, but will generally only be minor effects by themselves unless the groups are widely divergent on the initial measures (more than 1 standard deviation), or there is reason to suspect radically different reliability coefficients in the two groups (different by more than .30).

4. Threats to Validity

Using the following general conventions, each effect size should be coded for each of the "threats" listed below using the following conventions. Be careful that coding is honest, fair, and not overly harsh. In cases where there is both an experimental and control groups contained in the study, a threat to the internal validity of the study generally requires differential effect in the two groups. Obviously, children will mature over a year's time. The question of internal validity is whether the process of maturation was different in the experimental and control groups so that it appeared that the treatment had an effect when in reality it was diferential maturation.

2-F.14

0 = Not plausible threat to internal validity.
1 = Potential minor problem in attributing the observed effect to treatment; by itself, not likely to account for substantial amount of the observed results.
2 = Very plausible alternative explanation which could account for substantial amount of the observed results. Requires more than just a suspicion that something may have gone wrong.
3 = Very plausible alternative explanation which by itself could explain most or all of the observed results. Should be clear evidence of a major threat to the internal validity of the study.

A. Maturation

Biological, physiological, or psychological "processes within the respondents may vary systematically with the passage of time" but not as the result of specific events external to the respondents. Examples of maturation include growing older, more tired, better coordinated, etc. Suppose an experimenter claimed that a series of prescribed play activities were effective in promoting bladder control in infants; as evidence he showed that 2% of the 15-month old infants starting his experiment had control, and 75% of these infants achieved control 9 months later. His claim is questionable since the normal infant naturally develops bladder control during this period.

B. History

Any events other than the experimental treatment that affected subjects in experimental and control groups differently and could have affected status on the outcome measure. History threats differ from selection threats in that with selection threats subjects in groups are different to begin with, with History threats subjects in different groups may be comparable to begin with but are affected differentially by some external phenomenon during the course of the treatment. For example, 100 students are randomly assigned to an experimental English class to enhance writing skills or to a control English class with no particular emphasis on writing. At the end of the treatment, the experimental group is superior to the control group in writing skills. But on closer examination we find that because of the school's scheduling procedures, all students in the experimental English class also had social studies from a teacher who required weekly, writing assignments while those in the control class had social studies from a teacher who required no writing assignments. Hence the differences in writing skills may have been attributable to the social studies class (which was not a part of the defined treatment) rather than the English class (i.e., the treatment).

C. Testing

The effects of taking a test on the outcomes of subsequent administration of the same or a highly related test. Taking some cognitive-ability tests may increase your score by several points on a second administration of the same test or a parallel form of it. It is unusual if two or three practice sessions on a test increase a person's score by more than 1/4 standard deviation. For example this would be a threat if children were tested repeatedly with the same test instrument on a pre-post design or children in the experimental group were repeatedly tested and children in control group were not. Another example is when the treatment inappropriately teaches to the test--as would be the case if the treatment

BEST

consisted of practice on the same types of activities as are included in a particular Stanford-Binet subtest and the outcome was the Stanford-Binet. Don't confuse appropriate "test content" with "teaching to the test". The above is an example of "teaching to the test". There is nothing wrong with selecting a test which appropriately measures the area in which your intervention program was trying to create growth, as long as you have not been teaching the same types of items that are on the test. In other words, you can measure vocabulary growth in many ways. If a program goes through a particular test of vocabulary competency, selects the words that are used in that test, and then drills children using those words and that format, and then tests them again four months later, it would be a serious testing threat.

D. Instrumentation

Changes in the instruments (tests, judges, various measuring devices) with which persons participating in an experiment are observed may produce changes in the scores over time which are mistaken as treatment effects. For example, judges observing and rating some performance may be more lenient from time 1 to time 2. Or children tested during the first day of a new school may not do so well as they would 2 weeks later after they become more comfortable with the new situations. Or two "parallel" forms of the same test amy emphasize different skills differentially (e.g., vocabulary versus comprehension). Or a biased test administrator may consciously or unconsciously "fudge" results or be more positive for children in the experimental group. Individually administered cognitive tests by non-blind administrators almost always have some threat in this area.

E. Statistical Regression

The inevitable tendency of persons who are selected because their scores are extreme (high above or far below the mean) on Measurement A to be less extreme (less high above or less far below the mean) on Measurement B. When the correlation between A & B is less than perfect, which for all practical purposes is always. For example, regression towards the mean will be a threat if children in the experimental group were selected on the basis of an extreme score which was used simultaneously as a pretest and there was not a control group or the control group was not selected on the basis of the same extreme scores. Regression will also be a threat if children are selected because they are deviant on a pretest and then are posttested on a completely different posttest. When children from substantially different populations are matched so that we have two groups of children who are the same on the variable on which the populations differ, there will almost always be regression back towards the means of the respective populations. The amount of regression predictable is easily calculated. If you have questions about how to do those calculations, see Karl.

F. Selection Bias

Subjects in the experimental and control group were selected on different bases in such a way that subjects in the two groups are not comparable on variables that may be causally related to outcome selection bias. Includes all of those factors which conspire to make the experimental and the control groups unequal at the outset of an experiment in ways which cannot be properly taken into account in the analysis of the data. For example, selection might invalidate a comparison of curricula A and B if older, more experienced teachers were selected to teach the more difficult curriculum. In almost all instances the best way to completely guard against selection bias is to have reasonably large samples and by employing the random assignment of persons or classrooms to treatments and then using statistical analyses of the final data which are based on the randomization procedure. Quasi-experimental designs will almost always have some selection bias.

G. Experimental Mortality

The differential loss or "dropping out" of persons from two or more groups being compared in an experiment. If attrition is greater under curriculum A than curriculum B, a comparison of A and B at the end of one school year might be biased in that the students completing A would be brighter--on the average--than those completing B. This might occur because the slower students were fatalities under curriculum A. The key issue in whether experimental mortality is a threat to the internal validity of a study is whether the attrition was systematic or random. If you have two groups of 25 people who were randomly assigned to groups and each group loses 5 students, the control group loses the top 5 students and the experimental group loses the bottom 5 students, this will obviously make it appear that there are greater differences between the groups on the posttest than there really is. Alternatively, if both groups lose their bottom 5 students, the mortality has probably affected both groups about the same and posttest differences between the groups will not be nearly as seriously affected. If each group loses a random 5 students, the threat to the internal validity of the study is even less serious. As can be seen, it is not just an issue of whether students were lost, but the characteristics of the students who were lost.

H. Inappropriate Statistical Procedures

Refers to inappropriate procedures used in statistical analysis which may affect the estimation of the effect size. Examples include basing correlations on extreme groups, failing to account for serious disproportionality in an unbalanced ANOVA design, or using an inappropriate design. Another more subtle example of inappropriate statistical procedures is when you must base your estimation of effect size on the probability or obtained t or F ratio and the researcher has used an inappropriate unit of analysis in analyzing the data (as would be the case if classes were randomly assigned to groups and subjects were used as the unit of analysis). This would not be a problem if the article reported raw means and standard deviations. But when you must base your estimate of effect size on a statistic that might have been inflated or deflated using inappropriate unit of analyses, it would be a concern. Unit of analyses problems will usually only create minor threats.

I. Description of Sample

J. Other

5. General Index of Validity

Note: The following table is designed as a guide to establishing the general index of validity for a study. It was not designed to handle all possible combinations. If you are coding a study which is not covered by the guidelines or seems to contradict the guidelines, see Karl and/or make a note on the convention expansion/disagreement sheet.

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GENERAL INDEX OF VALIDITY

RATINGS: 1 (Good)	2	3	4	5 (Poor)
• only "1" ratings no more than 2 points. • well executed true experimental designs (only 1 or 2 "1" ratings). • well executed double blind crossover designs with order effects balanced and sufficient time for previous treatments (usually drugs) to become inactive (only 1 or 2 "1" ratings).	• Only "1" ratings, no more than 4 points. • true experimental designs with minor problems (3-4 "1" ratings). • well executed quasi-experimental designs (no "1" except for selection). • well executed single subject designs (no "1" except history). • crossover designs with minor problems (3-4 "1" ratings).	• Only "1" or "2" ratings, no more than 6 points. • quasi-experimental designs with minor problems (2-4 "1" ratings and 1 "2" rating). • well executed pre-post designs (no "1" besides selection, maturation, history--no "2" ratings). • single subject with minor problems. • true experimental with moderate problems (2-4 "1" ratings and 1-3 "2" ratings).	• More than 6 points but no "3" ratings. • pre-post designs with moderate additional problems (1-5 "1" ratings and/or 1-2 "2" ratings). • quasi-experimental with moderate problems (6 or more points, with at least 2 "2" ratings). • true experimental with major problems (7 points with at least 3 "2" ratings). • single subject with moderate problems.	• Any design with one or more "3" ratings. • pre-post designs with major problems (7 points with at least 2 "2" ratings). • single subject/case studies with major problems.

6. Adequacy of Descriptive Information Information Provided About:

   A. Sample Description (subject variables): pertains primarily to Section II of the coding sheet and describes characteristics of the sample population.

   B. Intervention Description (treatment variables): pertains primarily to Section III of the coding sheet and describes treatment characteristics.

   C. Design and Analysis Description (design variables): pertains primarily to Section IV of the coding sheet and describes the design and analysis procedures employed.

   1 = Very Adequate - Article describes the sample, intervention, or design so that the experiment could be replicated and you, as a reader, are confident about the procedures which were used and the subjects which participated. Coding a "1" does not mean that there are no blanks in Sections II, III, and/or IV. If you code it "1", there will typically not be very many blanks but more importantly the information which is presented is presented clearly and adequately described so that you are confident about the information which is given. Of course, if there are many blanks in Sections II, III, and/or IV, a "1" rating would not be appropriate.

   2 = Partially Adequate - Essential pieces of information are missing in categories II, III, and/or IV which would make it difficult to replicate the experiment unless additional information were given. Additionally, what information is given suffers from some confusing presentation so that there are questions about what really did happen.

3 = Inadequate - Information about the sample, intervention, or design is very poorly described. It is difficult to be confident about what happened in the study, replication would be impossible without further information, and many blanks exist in categories II, III, and/or IV.

V. OUTCOME

1. Outcome Measured for:

   1 = Target Child: Child who is the prime focus of the intervention effort, whether medical, educational, setting change, or other type of intervention.
   2 = Sibling of Target Child: Includes any children living in the same home with the target child for whom effects of the intervention are measured.
   3 = Non-Sibling Peer of Target Child: Includes any children who associate with the target child but do not live in the same home for whom intervention effects are measured.
   4 = Parents: Parents of the target child or any other adults living in the same home with the target child.

2. "Test" Administered to:

   1 = Group: Includes any test which is administered to more than one person at the same time.
   2 = Individual: Any test which is administered to only one person at a time. Includes interval observation data in which for any given interval, only one person is being observed. Interview data, physical exam data, and any other data for which the data collection only involves one person at a time.

3. Screening Measure: A screening measure is a general term for any instrument which is used as a rapid selection process, usually not very precise, to select subjects for further testing, diagnosis, or treatment. Examples of frequently used screening measures include the Denver Developmental Screening Test and the Fluharty Preschool Screening Test for Language. Code "0" if the instrument was not developed to be used primarily as a screening test and "1" if the instrument was developed to be used primarily as a screening test regardless of its use in this particular study. For example, if the Denver Developmental is used as a primary outcome measure with no intent that it function as a screening device, it should still be coded "1" on this item.

4. Type of Measure

   The following listing provides examples of the types of tests which should be included in each category. The EIRI Test Description Manual contains brief descriptions of many of these tests as well as norm data and descriptions of the types of items included. For each test described in the EIRI test manual, the specific subscales, if any, which should be computed are described. Except where so noted in the test manual, compute only one effect size per test. If in doubt about whether a test has been used appropriately or the number of effect sizes to compute per test, see Dennis or Karl.

BEST

1 - Verbal Intelligence Test: Include tests like the verbal portion of Wechsler Scales (WISC, WISC-R, and WPPSI), Verbal Scale on McCarthy Scales, and the verbal portion of the Cognitive Abilities Test (CAT).

2 - Non-Verbal/Performance Intelligence Test: Include performance portion of Wechsler Scales (WISC, WISC-R, and WPPSI), Perceptual-Performance Scale on McCarthy Scales, Progressive Matrices, Goodenough-Harris Drawing Test, Leiter International Performance Scale, Pictorial Test of Intelligence, and Columbia Mental Maturity Scale.

3 - Full Scale/General Intelligence Test: A psychological test designed to measure cognitive functions such as reasoning, comprehension, and judgment. Include Full Scale on Wechsler Scales (WISC, WISC-R, and WPPSI), Stanford-Binet, General Cognitive Index (GCI) or the McCarthy Scales, Slosson Intelligence Test, the Mental Development Index (MDI) on the Bayley Scales of Infant Development, and the Otis-Lennon Mental Ability Test. Note: The Quick Test and the PPVT (Peabody Picture Vocabulary Test) should be coded #10 (Receptive Language).

4 - Developmental Quotient: Infant scales provide a basis for establishing the child's current status and any deviations from normal expectancy. Include the Gesell Development Schedule, the Cattell Infant Intelligence Test, the Infant Psychological Development Scale (Piagetian), the Griffiths, and the Alpern-Boll.

5 - Fine Motor: Small muscle-dependent skills such as reaching, grasping, and eye-hand movement. Include Fine Motor Composite score on the Bruininks-Oseretsky Test of Motor Proficiency.

6 - Gross Motor: Large muscle-dependent skills such as walking, running, and throwing. Include Gross Motor Composite Score on the Bruininks-Oseretsky Test of Motor Proficiency.

7 - Gross/Fine Motor Combination: Include Total Battery score on the Bruininks-Oseretsky Test of Motor Proficiency, the Motor Scale on the McCarthy Scales of Children's Abilities, and the Motor Scale on the Bayley Scales of Infant Development.

8 - Perceptual Organization: Include Perceptual-Motor Tests/Visual Motor Tests. Examples include the Bender Visual Motor Gestalt Test, Developmental Test of Visual-Motor Integration (Beery), Purdue Perceptual-Motor Survey, Developmental Test of Visual Perception (Frostig), and the Revised Visual Retention Test.

9 - Expressive Language: Skills required to communicate ideas through language such as writing, gesturing, and speaking. Include tests like the Carrow Elicited Language Inventory, Developmental Sentence Analysis, and the Parsons Language Sample.

10 - Receptive Language: Language that is spoken or written by others and received by the individual. Includes listening, reading, and understanding sign language. Include tests like Assessment of Children's Language Comprehension, Language Comprehension Test, Peabody Picture Vocabulary Test, Quick Test, and the Vocabulary Comprehension Scale.

11 - Articulation: The production of speech sounds. Include tests like Goldman-Fristoe Test of Articulation and the Templin-Darley Test of Articulation.

12 - Language Combination or Other Language: Note. Two or more of #'s 9, 10, and 11 or some other language test that does not fit in #9, 10, and 11. Also include auditory discrimination/perception tests. Include tests like the Houston Test of Language Development, Northwestern Syntax Screening, Test of Language Development, Utah Test of Language Development, Receptive-Expressive Emergent Language Scale (REEL), and the Sequence Inventory of Communication Development.

2-F

13 = Social Functioning/Adaptive Behavior: Ability of an individual to interact appropriately and effectively with his/her environment. Includes tests like AAMD Adaptive Behavior Scale, Adaptive Behavior Inventory for Children, Balthazar Scales of Adaptive Behavior, Cain-Levine Social Competency Scale, Preschool Attainment Record, T.M.R. School Competency Scales, and the Vineland Social Maturity Scale.

14 = Interpersonal Interaction: Observations or ratings of the quality or frequency of an individual's interactions with others in his/her environment.

15 = ITPA (Illinois Test of Psycholinguistic Abilities): Psycholinguistic measure.

16 = Preacademic/Academic: Readiness tests and achievement tests. Include tests like the Boehm Test of Basic Concepts, Classroom Reading Inventory, Key Math Diagnostic Test, Peabody Individual Achievement Test, Wide Range Achievement Test, Woodcock Reading Mastery Test, and the Metropolitan Readiness Tests.

17 = Psychological/Emotional Functioning: Includes Behavioral Checklists, projective tests, and personality tests. Examples of Behavioral Checklists include the Devereux Child Behavior Rating Scale, Burks Behavior Rating Scale, and the Walker Problem Behavior Checklist. Examples of projective tests include the Children's Apperception Test (CAT), House-Tree-Person, and the Draw-A-Person Test.*

18 = Self-Concept: The person's sense of his or her own identity, worth, or capabilities. Include tests like Coopersmith's Self-Esteem Inventory, Piers-Harris Children's Self-Concept, and Lipsitt's Self-Concept Rating Scale for Children.

19 = Attitude: Typically yield a total score indicating the direction and intensity of the individual's attitude toward a person, policy, program, or other stimulus category. An example is the Likert-type scales and/or the Thurstone-type scales.

20 = Parenting Skills: Degree to which the child's parents exhibit skills necessary or appropriate in developing their children's potential or managing their child.

21 = Health Status/Physical Growth: Soundness/vigor of body and mind; freedom from defect or disease. Measurements of height, weight, and head size are examples of such measurements. If an article provides a large number of very specific measurements of growth and physical development, you should code measures of height, weight, and head circumference as separate effect sizes. Collapse all other measures of physical growth and development into one average effect size. If for your particular study, this does not seem to make sense, see Karl or Dennis.

22 = School Progress/Placement: Percentage of children placed in special service programs and/or percent of children retained in grade.

23 = Other (specify)

*Note: The Draw-A-Person Test is sometimes scored and interpreted as a Developmental Scale. If scored and interpreted as a Developmental Scale, it should be coded as #4 and not #17.

5. Generalization of Skill Across Persons or Settings

Generalization refers to the degree to which the person can exhibit a skill or knowledge gained in one setting or with one particular trainer in other settings or with other trainers. Generalization does not refer to whether the skill or knowledge is maintained over time. The importance of generalizing skills is clear with outcomes such as language acquisition, self-help skills, and many academic and social functioning skills. Generalization is not relevant for variables such as IQ, physical growth, and school progress. Definitive definitions of when generalization is important and when it is not depends to some degree on how a particular category of outcomes is defined and measured. For each outcome, you will need to make a decision on whether generalization of the skill across persons and settings is relevant for this particular study, outcome measure, and sample of subjects; and, if so, the degree to which the outcome assessed generalization. For example, if the study is assessing the change in infant reflexive behavior as a function of diet, generalization is not an important or relevant issue and should be coded "1" (not a concern for this outcome). As another example, suppose a particular experimental treatment was intended to develop language skills with autistic children and outcome of expressive language administered by the trainer should be coded "4" (a concern but outcome did not assess generalization, or assessed it poorly). An outcome which assessed expressive language in the training setting but used a person who was strange to the child to elicit the expressive language should be coded "3" (a concern, outcome assessed generalization somewhat). If the outcome had been assessed in a different setting and had utilized a person who was strange to the child, the outcome should be coded "2" (a concern, outcome assessed generalization well). If the study had also examined the effect of the intervention on the child's parents or siblings and assessed parental attitude towards handicapping conditions and sibling's growth in expressive language, effect sizes for those outcomes should be coded "1" (not a concern for this outcome). Generalization is only a concern for the person who is directly receiving training. A general guide is to code the item "3" if generalization was assessed reasonably well across persons or settings; code it "2" if generalization was assessed reasonably well across both persons and settings, and code "4" if generalization was a concern and was not assessed.

6. Instrument

1 = Opinion by parent or untrained person or involved professional. Opinion is defined as any measure which solicits a person's opinion about a phenomenon or set of circumstances such as their child's ability to speak, activity level, attitude towards school, etc. which is based on a global impression. Whenever more specific opinions are solicited to well-defined questions or ratings instead of a general global impression, it should be coded as "3" or "4" below. To be coded "1", the opinion should be solicited from an untrained parent or other person or from a professional who has been involved in the intervention program.

2 = Opinion by clinician, teacher, or trained professional (uninvolved). The definition of opinion for this item is the same. However, in this instance, the opinion will be solicited from a professional person who was not involved in the treatment program.

3 = Interview, rating or questionnaire. This includes any written or verbal response to a measure having 10 or more items. This coding includes standardized rating scales such as the Walker Behavior Checklist, the Wise Hyperactivity Rating Scale, the AAMD Adaptive Behavior Checklist.

4 = Unstandardized objective measure. To be rated in this category, the majority of the ratings must be based on recall of past observations rather than ratings done at the same time the child is asked to perform a given task.

5 = Systematic Observation. Direct real time observation using well defined operational definitions. This includes ratings of tasks a child is asked to perform such as stacking blocks, walking, etc. which are not part of a standardized measure (e.g., Stanford-Binet IQ Test), and observations such as interval sampling of on-task behavior from a classroom setting.

6 = Standardized Objective Measure. An outcome instrument of empirically selected items which has unambiguous directions for use, standardized procedures for administration and scoring, adequately determined norms, and data on reliability and validity. Included in this category would be paper and pencil tests, IQ measures which involve demonstration, interview, and observation, and verbal response measures such as the PPVT.

7 = Physical measurement. Any calibrated measure of physical or neurological growth, functioning, or performance such as height, weight, head circumference, heart rate, EEGs, or galvanic skin response.

8 = Composite: Any combination of instruments used to measure the outcome for which separate scores cannot be determined. In other words, the outcome may be an average percentile ranking of a combination of systematic observation and standardized objective measures where separate scores for the different measures are not given.

9 = Other: Any other instrument used to measure outcome which does not fit into one of the previous categories. Data about school progress or retention or placement in special classes should be coded in this category.

7. Primary Data Collector/Informant

1 = Untrained paraprofessional or parent. Assume parents and paraprofessionals are untrained in collecting data unless the article specifically states that they have been trained.

2 = Trained paraprofessional or parent. Any paraprofessional or parent who has been specifically trained to collect the data on which that outcome is based. Interviews with parents concerning their child's activity level would not be counted in this category unless the parent had been trained to systematically collect and record observations during the week on which an interview could then be based.

3 = Professional but not likely to be trained by virtue of professional status. For example, a classroom teacher who administers a Stanford-Binet or a WISC who was probably not trained in the administration of individualized IQ test. Assume that professionals who are not typically trained to administer a particular test are not trained for the purposes of this study unless specific information is given in the article.

4 = Professional specifically trained or likely to be trained by virtue of professional status. This should be coded when the article states that the professional person was specifically trained or the test is a type of test for which professionals in that area are typically

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trained. For example, most psychologists have been trained to give individual IQ tests, most teachers have been trained to administer standardized achievement tests, and most speech therapists have been trained to administer the PPVT or Arizona Articulation Test.

8. Instrument Reliability:

   1 = .80 - 1.0
   2 = .79 - .60
   3 = .59 and below

   In as many cases as possible, instrument reliabilities for outcomes should be estimated. If no information is reported in the study specific to the data collection for that particular outcome with that group of subjects, report information from the EIRI test manual. If neither these types of information are available, estimate the reliability using the following conventions as anchor points:

   Teacher-developed or criterion-referenced measures of well-defined skills = .80; Teacher-developed or measures of attitudes or less well-defined skills = .60; Parent reports of child's general functioning in some area = .60; Measures of physical growth, school progress/pacement, placement in special classes = .95; Criterion-referenced tests of motor skills based on actual demonstration = .90.

9. How #8 Was Estimated:

   1 = Reported in Study: Only coded for those studies which actually report a reliability for that particular outcome for that particular sample of subjects. Should not be coded in this category if the study reports only that reliability for the instruments is XX.
   2 = Test Manual Literature/Literature: If the estimate of reliability is based on the EIRI test manual or is reported in the article as a citation from the literature.
   3 = Estimated: Reliability was estimated for the particular measure based on conventions given above. If you do not believe a reliability can be estimated, see Dennis or Karl before giving up.

10. General Quality of Outcome Measure:

    Use the following procedures for coding the general quality of the outcome measure.

STEP 31

Type of Instrument	Points
1. Opinion by parents or untrained or involved professional	1
2. Opinion by uninvolved clinician, teacher, trained professional 3. Interview, rating, questionnaire 4. Unstandardized objective measure 5. High inference observation system	3
6. Systematic observation (low inference system) 7. Standardized objective measure 8. Physical measurement	5

[STEP #2] Add points to "base" obtained in Step #1 for following characteristics.

+1	0	-1
• individual administration • data collector specifically trained or clearly professionally qualified • reliability reported or from established instrument with .85 or higher • clearly blind administration • very functional outcomes with generalization well addressed	• group administration • qualifications of test administrator unclear • reliability estimated between 1.00 - .70 or clearly established between .84 - .70 • probably blind administration	• not qualified to administer instrument • reliability (either reported or from conventions) less than .70 • probably or definitely not blind administration • narrow outcome - in area where functionality important but not present, e.g., language and outcome is mere imitation • high inference or poor apparent definitions

[STEP #3] Categorize in one of five levels of "General Quality of Outcome Measure" according to points assigned in combination of Steps #1 and #2.

LEVELS of General Quality of Outcome Measure	Points
1 = high	7+
2	5-6
3	3-4
4	1-2
5 = low	0 or less

[STEP #4] Adjust LEVEL determined in Step #3 by:

- Dropping 1 level if outcome was developed as a screening measure and used as outcome or was substantially inappropriate for use with that particular population.
- Dropping 2 levels if outcome was totally inappropriate for use with that population or was an extremely narrow and non-functional measure or examiner was extremely unqualified.

11. Months After Intervention Initial Outcome Was Measured: Report in whole months the total time elapsed since the program for this ES group commenced. Round 15 days or less down to the last whole month. Round 16 days or more up " " next " ". Example: 9 mo. 13 days - code 9.

12. Months After Intervention Completed Outcome Was Measured: Report in whole months the total time elapsed since the program for this ES group commenced. Round days same as above. Example: 0 mos. 7 days - code 0. If the program was still in operation at time of outcome measure, code 0.

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VI. CONCLUSIONS

1. Standardized Mean Difference Effect Size

Standardized mean difference effect sizes can be computed in a number of different ways. The order of preference for calculating an effect size is given in Item 2 below (Data from Which Mean Difference Effect Size Was Calculated). For preferences 1, 2, and 3, there are a number of alternative ways to obtain the means and standard deviations used. The matrix below indicates the way to determine which information to use. First, go down the rows from raw gain to final status measure. Pick the information in the article which has the lowest number associated with it. Then move from left to right in that row across the columns and pick the standard deviation measure which you come to first.

Source of Mean Difference Estimate	a. no treatment SD	b. pooled SD	c. test manual SD
1. Raw gain			
2. Covariance adjusted			
3. Residual gain			
4. Final status			

In addition, it will sometimes be necessary to compute an effect size for when one experimental treatment has been compared to another experimental treatment. In such instances, you must determine which treatment to use as the "experimental" group and which treatment to use as the "control" group. In making the computations for mean of the "experimental" group minus mean of the "control" group divide by the standard deviation of the "control" group. In those instances, select the most intensive treatment as the "experimental" group and the least intensive as the "control" group. In cases where there is not a most intensive treatment (e.g., home-based versus center-based for the same amount of time or paraprofessionals versus professionals), select the most frequently used option as the "experimental" group. If there are questions about which option would be the most frequently selected, talk with Karl.

In calculating effect sizes when $\bar{X}$'s and SD's are not given, the estimates of correlations between tests must sometimes be made. The following conventions have been adopted for some of the most frequently required estimates (all of these represent immediate test-retest. Tests separated substantially further in time would be slightly lower.)

	Achievement	IQ's Good	IQ's Average	IQ's Poor
Good	.60	.80	.65 - .70	.45
Average	.50	.65 - .70	.60's	.40
Poor	.40	.45	.40	.30
hievement	.60	.60	.50	.40
aptive Behavior	.30	.40 to .50		

Adaptive to Adaptive	.80
Visual-Perceptual to Visual-Perceptual	.80
Visual-Perceptual to Achievement	.45

2. Data from which Mean Difference ES Was Calculated

1 = Means and control group SD - Article gave means for the experimental and control groups and a standard deviation for the control group from which ES was calculated.
2 = Means and pooled SD - Article gave means for the experimental and control groups and a pooled standard deviation from which the ES was calculated.
3 = Means and published test SD - Article gave means for the experimental and control groups and the standard deviation was known for the published test used as an outcome measure. ES was calculated from these data.
4 = t ratio/F ratio from one-way ANOVA - Article gave a t or F value for one way ANOVA from which ES was calculated.
5 = t ratio from matched pairs, t test, or F ratio from mixed model ANOVA
6 = Source of variance table from n-way ANOVA
7 = Source of variance table from n-way ANCOVA or mixed model ANOVA
8 = ANCOVA F ratio.
9 = Non-parametric test statistic except chi squared.
10 = Probability estimate for t test or one-way ANOVA.
11 = Regression lines.
12 = Proportions ("probit" transformation).
13 = Chi square table.
14 = Other ________________________
(specify)

3. Scale of Mean Difference for ES

1 = Raw gain score: Code if the way in which means between experimental and control were calculated was the difference between the pretest scores and the posttest scores for each group, in other words (experimental post - experimental pre) - control post - control pre).

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2 = Covariance adjusted scores: Differences between experimental and control group were computed using scores which had been adjusted for differences on some other concomitant variable using analysis of covariance procedures.
3 = Residual gain score: Code when posttest scores on the measure were predicted using subjects' pretest scores and the outcome measure was based on the difference between the subjects' predicted score and his/her obtained score.
4 = Final status measures: Differences between experimental and control group were computed using an unadjusted posttest score for the two groups.

4. Variance Effect Size

This is a measure of the degree to which the treatment may have impacted on the distribution of the population rather than the mean level of performance. It is obtained by dividing the standard deviation of the experimental group by the standard deviation of the control group.

5. Author's Conclusions

0 = not considered - author(s) make no statement regarding clinical significance of treatment.

1 = intervention appears to work - author(s) conclude that treatment works. Those cases where the author concludes that the intervention works but only for certain subsets will usually be accounted for by the different ES categories. If this does not account for it, code it "1" anyway.

2 = data equivocal about intervention effectiveness

3 = intervention appears not to work

6. Country of Study

7. Profession of Research Designer

AVAILABLE

COMPUTATION OF STANDARDIZED MEAN DIFFERENCE EFFECT SIZES[1]

DIRECT CALCULATION

$$\frac{\bar{Y}_E - \bar{Y}_C}{S_C}$$

General Guidelines: In all cases, we need an estimate of where the average subject in the "experimental" group would score with respect to a distribution of comparable subjects who did not receive the treatment. Therefore, in all cases, we need an estimate of the average differences between groups which has been standardized (or divided by) the standard deviation of the distribution of comparable subjects. When direct calculation is not possible, use the following guidelines. Examples for the most common applications follow.

Mean Differences: We need the best estimate of the average difference between "experimental" and "control" group scores. When subjects are randomly assigned to groups, we assume they are equal in the beginning, so $\bar{Y}_E - \bar{Y}_C$ yields an accurate estimate of average differences between groups. However, to the degree that there are random differences between the groups in the beginning, $\bar{Y}_E - \bar{Y}_C$ will also be biased. Using $(\bar{Y}_E - \bar{X}_E) - (\bar{Y}_E - \bar{X}_C)$ improves the estimate somewhat, as would covariance adjusted scores. Although neither are perfect, both are better than using only final status scores. When groups are not randomly assigned, anything we can do that will adjust the final status scores so they are more nearly like scores of groups which are comparable in the beginning is helpful (e.g., gain scores, covariance adjustments, residualized gain scores). The general rule is to obtain the best estimate possible of what the average difference would have been if the groups had been comparable in the beginning.

Standard Deviation: The standard deviation of the "control" group is used to standardize the average mean difference between groups because that is the best estimate of variance in the distribution of untreated persons. Never use a standard deviation which has been artificially reduced (e.g., through analysis of covariance, or stratification in analysis of variance) or which estimates some other distribution's variance instead of the variance in a distribution of untreated persons (e.g., standard deviation of mean differences, standard deviation of gain scores, etc.).

---

[1] Throughout this summary, the following notations apply: E (as used in $\bar{X}_E$, n_E, S_E) refers to the "experimental" group; C (as in $\bar{X}_C$, n_C, S_C) refers to the "control" group; n_E or n_C refers to the number of subjects in the "experimental" and "control" groups respectively; N refers to the total number of subjects in the design; n_p refrs to the number of pairs of subjects; r_{xy} refers to the correlation between two variables (e.g., pre-post test, covariate and dependent variable, matching variable and dependent variable). $\bar{X}$ refers to the pretest mean; $\bar{Y}$ refers to the posttest mean.

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Independent

t Test Designs

Effect Size Computation from Significance Test

a) given t value

$$ES = t\sqrt{\frac{1}{n_E} + \frac{1}{n_C}}$$

Standard Deviation Used in ES Computation

a) given $S_{\bar{Y}_E - \bar{Y}_C}$

$$S = \sqrt{\frac{S^2_{\bar{Y}_E - \bar{Y}_C}}{\left(\frac{1}{n_E} + \frac{1}{n_C}\right)}}$$

ASSUMES:

- $S_E = S_C$

Correlated Pairs

~~Matched Pairs~~ t Test

Effect Size Computation from Significance Test

a) given matched pairs t test (t_d)

$$ES = t_d\sqrt{\frac{2}{n_p}(1-r^2_{xy})}$$

Standard Deviation Used in ES Computation

a) given standard deviation of differences (S_d)

$$S = \frac{S_d}{\sqrt{2(1-r^2_{xy})}}$$

b) given standard deviation of mean differences ($S_{\bar{d}}$)

$$S = \frac{S_{\bar{d}}}{\sqrt{\frac{2}{n}(1-r^2_{xy})}}$$

ASSUMES:

- r_{xy} (correlation between members of pairs on the dependent variable) is known or can be estimated)
- n_p is the number of pairs in the analysis
- $S_E = S_C$

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Raw Gain Scores

Effect Size Computation from Significance Test

a) given gain score t (t_G)

$$ES = t_G\sqrt{2(1-r_{xy})\left(\frac{1}{n_E}+\frac{1}{n_C}\right)}$$

Standard Deviation Used in ES Computation

a) given S of gain scores

$$S = \frac{S_G}{\sqrt{2(1-r_{xy})}}$$

b) given SD of mean differences in gain $(S_{\bar{G}_E - \bar{G}_C})$

$$S = \frac{S_{\bar{G}_E - \bar{G}_C}}{\sqrt{2(1-r_{xy})\left(\frac{1}{n_E}+\frac{1}{n_C}\right)}}$$

ASSUMES:

- r_{xy} (pre-post correlation) is known or can be estimated
- $S_E = S_C$

RESIDUAL GAIN SCORES

Effect Size Computation from Significance Test

a) given t test for residualized gain scores (t_g)

$$ES = t_g\sqrt{(1-r^2_{xy})\left(\frac{1}{n_E}+\frac{1}{n_C}\right)} - \left((1-b_{y\cdot x})\frac{(\bar{X}_E-\bar{X}_C)}{S}\right)$$

Standard Deviation Used in ES Computation

a) given S for residual gains (S_g)

$$S = \frac{S_g}{\sqrt{1-r^2_{xy}}}$$

b) given S of mean difference in residual gain

$$S = \frac{S_{\bar{g}_E - \bar{g}_C}}{\sqrt{(1-r^2_{xy})\left(\frac{1}{n_E}+\frac{1}{n_C}\right)}}$$

ASSUMES:

- r_{xy} (pre-post correlation) is known or can be estimated
- pretest means ($\bar{X}_E$ & $\bar{X}_C$) are known or can be estimated
- regression coefficient of y or x is known or can be estimated
- $S_E = S_C$

ANALYSIS OF COVARIANCE

Effect Size Computation from Significance Test

a) given F value from one-way Analysis of Covariance

$$ES = 2\sqrt{\frac{F(1-r^2_{xy})(df_w-1)}{(n_E+n_C)(df_w-2)}}$$

Standard Deviation Used in ES Computation

a) given covariance adjusted MS_w (MS'_w)

$$S = \left(\frac{MS'_w}{(1-r^2_{xy})}\right)\left(\frac{df_w-2}{df_w-1}\right)$$

ASSUMES:

- r_{xy} (correlation between covariate and dependent variable) is known or can be estimated
- df_w (degrees of freedom within (i.e., residual, error)) is known
- only 1 covariate is used (if more than 1 covariate is used the df_w terms must be adjusted by 1 more for each additional covariate)
- MS'_w is given or can be calculated from SS' (covariance adjusted sums of squares)
- Covariance F is for a one-way analysis of covariance with only 2 levels on the treatment factor
- $S_E = S_C$

One-Way ANOVA Designs with Only 2 Treatment Groups

Effect Size Computation from Significance Test

a) given F value

$$ES = 2\sqrt{\frac{F}{n_E + n_C}}$$

Standard Deviation Used in ES Computation

a) given: MS_e

$$S = \sqrt{MS_e}$$

ASSUMES:

- Only two levels of the "treatment" factor exist
- $S_E = S_C$

n-Way ANOVA Designs

IMPORTANT NOTE

The within cell variance (MS_e) which is used to estimate the standard deviation in one-way ANOVA's has been artificially reduced through stratification in n-way and repeated measures designs. Therefore, you must first collapse all sources of variation, except the one for which you are computing an ES (usually treatment), into the error term. Then recompute the F ratio using the new MS_e and proceed using the same formula as used for a one-way ANOVA as shown below.

Effect Size Computation from Significance Test

a) given F computed from adjusted MS_e

$$ES = 2\sqrt{\frac{F}{n_E + n_C}}$$

Standard Deviation Used in ES Computation

a) given MS_e which has been recomputed by collapsing "extra" sources of variation into error term

$$s = \sqrt{MS_e}$$

ASSUMES

- only two levels of the "treatment" factor
- all "extra" sources of variation have been collapsed into error term and MS_e recomputed
- $S_E = S_C$

EXAMPLE

Source of Variation	Degrees of Freedom		Sums of Squares		Mean Square Error		F Ratio	
	Original	Adjusted	Original	Adjusted	Original	Adjusted	Original	Adjusted
Treatment (T)	1	1	857.0	857.0	857.0	857.0	4.67	2.12
Sex (S)	1	0	2218.5	0	2218.5	0		
IQ (I)	2	0	4859.0	0	2429.5	0		
T x S	1	0	763.4	0	763.4	0		
T x I	2	0	249.6	0	124.8	0		
S x I	2	0	6011.4	0	3005.7	0		
T x S x I	2	0	502.8	0	251.4	0		
Error	48 + Σ =	58	8808.6 + Σ =	23,413.3	183.5	403.7		
TOTAL	59	59	24,270.3	24,270.3		$\frac{23,413.3}{58}$	$\frac{857.0}{183.5}$	$\frac{857.0}{403.7}$

Incorrect ES Computation $2\sqrt{\frac{4.67}{60}} = .56$

Correct ES Computation $2\sqrt{\frac{2.12}{60}} = .38$

Appendix 2-G

Comparison of Average Effect Sizes Obtained Using Standard and Alternative Computational Procedures for the Same Data

AVERAGE EFFECT SIZE COMPUTED IN DIFFERENT WAYS FOR SAME COMPARISONS[a]

Source of Effect Size Calculation Used in Meta Analysis	Source of Alternative Effect Size Calculation					
	• posttest differences between groups • no treatment SD	• raw gain differences between groups • pooled SD	• posttest differences between groups • pooled SD	• raw gain differences between groups • published SD	• posttest differences between groups • published SD	t test or F ratio
• raw gain difference between groups • no treatment S.D.	.68 (28) .64 (28)	.59 (111) .60 (111)	.48 (28) .47 (28)	.57 (82) .45 (82)		.93 (23) 1.14 (23)
• posttest differences between groups • no treatment S.D.			.30 (326) .30 (326)		.30 (230) .26 (230)	.55 (22) .60 (22)
• raw gain difference between groups • pooled SD				.74 (22) .43 (22)		

[a] Numbers in parentheses indicate number of comparisons on which mean in that cell is based.

Appendix 2-H

Summary of Average Standardized Mean Difference Effect Sizes for all Levels of Each Variable

SUMMARY OF AVERAGE STANDARDIZED MEAN DIFFERENCE EFFECT SIZES FOR ALL LEVELS OF EACH VARIABLE

(for Intervention versus Control Comparisons)

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
I-1 STUDYID	(ID # for each study)	139	.53	.70	638	.42	.59
I-3 YEAR		139	.53	.70	634	.41	.59
	Year in which document was published	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
	1 = <65	18	.76	.60	11	.32	1.05
	2 = 66-69	5	-.76	1.25	216	.50	.59
	3 = 70-72	24	.72	.78	123	.53	.61
	4 = 73-75	21	.65	.73	150	.16	.55
	5 = 76-80	55	.52	.50	45	.49	.49
	6 = 81+	16	.25	.55	89	.45	.44
	MISSING DATA				4		
I-4 SOURCE1		139	.53	.70	628	.42	.59
	Type of publication	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
	0 = educational journal	61	.69	.76	314	.36	.66
	1 = medical journal	39	.37	.55	60	.76	.53
	3 = book	9	.40	.69	79	.41	.53
	4 = ERIC	14	.39	.31	23	.62	.30
	5 = dissertation/thesis	-	-	-	-	-	-
	7 = government report	16	.49	.92	112	.37	.39
	8 = other unpublished	-	-	-	40	.41	.53
	MISSING DATA				10		
II-1 AGEDV1		118	.53	.73	616	.41	.59
	Mean age in months at which dependent variable measured. . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
	1 = 0-12 mos	15	.37	.57	26	.49	.56
	2 = 13-24	10	.50	.41	69	.33	.60
	3 = 25-36	18	.44	.71	63	.54	.49
	4 = 37-48	30	.56	.66	48	.74	.76
	5 = 49-54	13	.02	.66	17	.84	.65
	6 = 55-60	15	.71	.71	103	.43	.41
	7 = 61-66	7	.10	.34	22	.68	.50
	8 = 67-72	5	1.16	.43	51	.29	.46
	9 = 73-84	1	.39	.00	81	.43	.68
	10 = 85-96	1	.18	.00	56	.37	.52
	11 = 97-108	2	-1.94	1.14	23	.37	.42
	12 = 109+	1	-.16	.00	57	-.12	.48
	MISSING DATA	21			22		

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
II-2 IQBEGIN1	Mean IQ prior to intervention	71	.53	.63	455	.41	.62
	1 = 0-40 IQ points	-	-	-	-	-	-
	2 = 41-55	11	.28	.37	2	1.29	1.20
	3 = 56-70	19	.69	.66	1	.77	.00
	4 = 71-85	7	.23	.74	71	.63	.50
	5 = 86-100	9	.35	.39	288	.38	.63
	6 = 101-115	25	.68	.70	93	.32	.63
	MISSING DATA	58			183		
II-3 NGROUP1	Size of sample	137	.52	.70	628	.41	.59
	1 = 0-10 children	39	.70	.71	85	.70	.58
	2 = 11-20	59	.54	.66	207	.37	.63
	3 = 21-30	22	.42	.39	144	.47	.65
	4 = 31-50	10	.11	1.10	72	.33	.44
	5 = 51-100	7	.64	.60	120	.27	.41
	6 = 101+	-	-	-	-	-	-
	MISSING DATA	2			10		
II-4 SES1	Socioeconomic status of child's family	60	.58	.57	624	.41	.57
	1 = high SES	-	-	-	9	.47	.22
	2 = middle	13	.72	.53	-	-	-
	3 = low	19	.59	.74	557	.41	.58
	4 = mixed	28	.50	.43	58	.39	.47
	MISSING DATA	79			14		
II-5 PART1	Source of participants	110	.51	.75	598	.40	.58
	1 = parent initiated	-	-	-	2	1.13	.05
	2 = solicited volunteer	41	.42	.58	475	.38	.60
	3 = referred	43	.46	.57	46	.51	.38
	4 = captive	21	.86	1.14	51	.38	.65
	5 = combination	3	.05	1.38	24	.51	.50
		(2)	(.37)	(.03)			
	MISSING DATA	29			40		
II-6 MALE1	Percentage of sample which is male	70	.57	.66	360	.36	.57
	1 = 0%	-	-	-	33	.36	.50
	2 = 1-39%	9	.92	.66	58	.33	.55
	3 = 40-49%	-	-	-	-	-	-
	4 = 50-59%	33	.48	.65	75	.36	.50
	5 = 60-69%	19	.70	.73	50	.31	.88
	6 = 70-85%	-	-	-	10	.72	.33
	7 = 85-100%	1	.53	.00	62	.44	.49
	MISSING DATA	69			278		

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED # of data points (N)	HANDICAPPED ES	HANDICAPPED SD	DISADVANTAGED # of data points (N)	DISADVANTAGED ES	DISADVANTAGED SD
II-7 SEVERE1	Severity of handicapping condition	117	.54	.62	636	.42	.58
	1 = homogeneous, at risk, borderline or mild	40	.61	.72	627	.42	.57
	2 = homogeneous, moderate	4	1.07	.36	1	.56	.00
	3 = homogeneous, severe/profound	9	.31	.60	1	.61	.00
	4 = heterogeneous with at least 2 of above	62	.49	.56	7	.24	1.45
		(2)	(.39)	(.01)			
	MISSING DATA	22			2		
II-8a PPERHND2	Primary handicapping condition of sample	137			638	.42	.59
	1 = multihandicapped	1	.22	-			
	2 = hearing impaired		-	-			
	3 = visually impaired		-	-			
	4 = mentally retarded	54	.43	.84			
	5 = speech/language impaired	5	.70	.32			
	6 = learning disabled	-	-	-			
	7 = orthopedically impaired	21	.35	.46			
	8 = other health impaired	4	.44	.26			
	9 = emotionally disturbed	7	.75	.69			
	10 = general developmental delay	7	.68	.32			
	11 = at risk (genetically or medically)				20	.58	.65
	12 = disadvantaged (financially, culturally, etc.)				618	.41	.58
	13 = other	10	1.08	.59			
	14 = combination	28	.58	.68			
	MISSING DATA	74			0		
II-9a BLACK1	Percent of sample which is black	28	.64	.78	471	.47	.55
	1 = 0%	10	.61	.88	35	.35	.65
	2 = 1-25	-	-	-	11	.59	.44
	3 = 26-50	1	.72	.00	18	.50	.42
	4 = 51-60	-	-	-	13	.08	.32
	5 = 61-70	-	-	-	57	.57	.62
	6 = 71-80	-	-	-	67	.45	.46
	7 = 81-90	-	-	-	29	.64	.62
	8 = 91-100	17	.66	.76	241	.47	.55
	MISSING DATA	111			167		
II-9b HISPNIC1	Percent of sample which is hispanic	31	.66	.76	550	.39	.56
	1 = 0%	28	.68	.80	501	.37	.57
	2 = 1-25	1	.38	.00	16	.57	.52
	3 = 26-50	1	.39	.00	6	.56	.42
	4 = 51-60	-	-	-	-	-	-
	5 = 61-70	1	.72	.00	-	-	-
	6 = 71-80	-	-	-	3	.64	.39
	7 = 81-90	-	-	-	-	-	-
	8 = 91-100	-	-	-	24	.46	.45
	MISSING DATA	108			88		

2-G.4

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
II-9c OTHMIN1	Percent of sample which is other minority.	26	.58	.81	542	.39	.56
	1 = 0%	24	.69	.74	537	.39	.56
	2 = 1-25	2	.75	.00	3	.30	.45
	3 = 26-50	-	-	-	-	-	-
	4 = 51-60	-	-	-	-	-	-
	5 = 61-70	-	-	-	-	-	-
	6 = 71-80	-	-	-	-	-	-
	7 = 81-90	-	-	-	-	-	-
	8 = 91-100	-	-	-	2	.25	.19
	MISSING DATA	113			96		
II-10 GEOGR1	Geographic setting of study	128	.53	.71	634	.42	.58
	1 = inner city	(1)	(1.93)	(.00)	(39)	(.32)	(.62)
	2 = city/suburban	14	.65	.86	221	.36	.56
	3 = rural/remote	100	.47	.70	282	.52	.62
	4 = mixed	2	.30	.33	25	.54	.38
	MISSING DATA	11	.82	.52	67	.21	.47
		11			4		
II-11a PPARENT1	% from one-parent homes	18	.65	.74	161	.47	.54
	1 = 0-25	1	.50	.00	50	.33	.58
	2 = 26-50	-	-	-	58	.45	.44
	3 = 51-75	13	.71	.86	20	.71	.73
	4 = 76+	4	.47	.26	33	.57	.44
	MISSING DATA	121			477		
II-11b FTHRHM1	% with father present in the home	18	.65	.74	210	.39	.53
	1 = 0-25	4	.47	.26	14	.65	.46
	2 = 26-50	13	.71	.86	83	.40	.58
	3 = 51-75	-	-	-	61	.42	.45
	4 = 76+	1	.50	.00	52	.28	.53
	MISSING DATA	121			428		
II-11c NCHILD1	Average number of children in home (includes target child). .	139	.53	.70	638	.42	.59
	1 = < 2.0	139	.53	.70	488	.44	.62
	2 = 2.1-3.5	-	-	-	108	.33	.40
	3 = 3.6+	-	-	-	42	.32	.59
II-11d MOTHED1	Mothers: Average number of years schooling completed	139	.53	.70	638	.42	.59
	1 = <10.0 grades	136	.53	.70	449	.43	.62
	2 = 10.1 grades+	3	.55	.45	189	.38	.48
II-11e FATHED1	Fathers: Average number of years schooling completed	139	.53	.70	638	.42	.59
	1 = <10.0 grades	139	.53	.70	573	.43	.59
	2 = 10.1 grades+	-	-	-	65	.25	.56

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-1 AGESTRT1	Mean age when intervention was started	116	.50	.73	625	.40	.58
	1 = 0 months	16	.29	.57	25	.46	.68
	2 = 1-6	22	.64	.74	110	.42	.44
	3 = 7-12	15	-.01	.98	47	.18	.62
	4 = 13-18	3	.35	.15	26	.76	.41
	5 = 19-24	6	1.30	.56	28	.50	.76
	6 = 25-36	26	.30	.48	33	.47	.25
	7 = 37-42	2	.63	.15	52	.60	.67
	8 = 43-48	9	.94	.75	79	.29	.58
	9 = 49-54	10	.90	.76	155	.24	.22
	10 = 55-60	7	.60	.48	70	.65	.66
	11 = 61-66	-	-	-	-	-	-
	MISSING DATA	23			13		
III-2 SETTING1	Setting in which intervention occurred	139	.53	.70	634	.41	.58
	1 = home	38	.41	.55	116	.36	.54
	2 = classroom	32	.74	.66	383	.44	.56
	3 = residential/hospital	18	.52	1.23	18	.38	1.06
	4 = doctor's office/clinic	14	.52	.52	-	-	-
	5 = other	-	-	-	-	-	-
	6 = mixed	37	.48	.64	117	.37	.58
	MISSING DATA				4		
III-3 TAILRD1	Degree to which intervention was tailored to child	125	.53	.71	588	.41	.60
	1 = no particular	48	.40	.75	196	.42	.59
	2 = somewhat	45	.71	.71	336	.39	.63
	3 = substantial	32	.48	.63	-	-	-
	MISSING DATA	14			50		
III-4a PARENT1	Involvement of parent or family member	133	.52	.70	621	.41	.59
	0 = not at all	50	.66	.86	321	.42	.61
	1 = minor	36	.48	.62	140	.42	.57
	2 = major	39	.44	.37	104	.42	.54
	3 = only intervenor	8	.20	1.06	56	.31	.60
	MISSING DATA	6			17		
III-4b TEACHR1	Involvement in intervention of professional teacher	134	.57	.63	628	.41	.59
	0 = not at all	69	.48	.66	141	.41	.65
	1 = minor	25	.53	.41	70	.44	.46
	2 = major	36	.71	.68	318	.35	.55
	3 = only intervenor	4	1.12	.48	99	.57	.66
	MISSING DATA	5			10		

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VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-4c AIDE1	Involvement in intervention of aide	123	.56	.64	589	.40	.60
	0 = not at all	75	.51	.66	251	.50	.58
	1 = minor	40	.68	.61	293	.28	.59
	2 = major	6	.46	.71	38	.69	.53
	3 = only intervenor	2	.47	.06	7	.71	.34
	MISSING DATA	16			49		
III-4d SUPPORT1	Involvement in intervention of support service personnel	116	.54	.65	549	.40	.61
	0 = not at all	61	.45	.68	446	.39	.62
	1 = minor	39	.66	.67	101	.47	.59
	2 = major	8	.64	.27	2	-1.68	.28
	3 = only intervenor	8	.54	.62	-	-	-
	MISSING DATA	23			89		
III-4e MEDICAL1	Involvement in intervention of medical personnel	119	.53	.65	557	.39	.60
	0 = not at all	99	.56	.65	506	.38	.61
	1 = minor	18	.34	.57	43	.54	.56
	2 = major	1	1.74	.00	8	.34	.46
	3 = only intervenor	1	.53	.00	-	-	-
	MISSING DATA	20			81		
III-5 ITRNING1	Training of primary intervenor	92	.56	.64	543	.36	.56
	1 = certified with 24+ hours program specific training	17	.76	.41	258	.46	.50
	2 = certified with no program specific training	10	.80	.56	41	.30	.49
	3 = not certified with 24+ hours program specific training	37	.52	.78	200	.24	.58
	4 = not certified with no program specific training	28	.40	.54	44	.42	.73
	MISSING DATA	47			95		
III-6a HRSDUR1	Hours of intervention per week	43	.67	.58	358	.54	.55
	1 = <.5 hrs/week	9	.74	.87	24	.54	.35
	2 = .6 - 1.0	10	.33	.19	43	.55	.42
	3 = 1.1 - 2.0	7	.57	.59	85	.69	.66
	4 = 2.1 - 5.0	9	.84	.61	55	.69	.54
	5 = 5.1 - 10.0	2	1.14	.78	38	.17	.33
	6 = 10.1 - 20.0	2	.63	.13	69	.56	.57
	7 = 20.1 - 30.0	4	.97	.05	4	.42	.30
	8 = 30.1+	-	-	-	40	.37	.46
	MISSING DATA	96			280		

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-6b WKSDUR1	Duration of intervention in weeks	126	.53	.72	616	.41	.58
	1 = 0 - 5 weeks	26	.67	.63	6	.56	.50
	2 = 6 - 10	-	-	-	17	.81	.59
	3 = 11 - 24	16	.52	.49	52	.62	.56
	4 = 25 - 52	39	.66	.62	327	.38	.58
	5 = 53 - 78	3	.36	.26	61	.63	.40
	6 = 79 - 104	6	.86	.75	59	.36	.58
	7 = 105+	36	.27	.91	94	.40	.53
	MISSING DATA	13			22		
III-6c TOTHRS1	Total hours of intervention	38	.76	.56	343	.54	.55
	1 = 0 - 20 hours	10	1.05	.69	7	.46	.22
	2 = 21 - 50	4	.44	.26	23	.72	.79
	3 = 51 - 100	8	.99	.69	5	.96	.16
	4 = 101 - 500	7	.38	.19	115	.48	.51
	5 = 501 - 1000	7	.69	.36	119	.59	.60
	6 = 1001+	2	.63	.10	74	.49	.46
	MISSING DATA	101			295		
III-7 MODE1	Type of intervention program	139	.53	.70	634	.42	.59
	1 = educational	66	.62	.60	557	.32	.57
	2 = medical	22	.38	.51	-	-	-
	3 = setting comparison	0	.34	1.31	12	.15	1.08
	4 = stimulation	10	.48	.84	4	1.09	1.09
	5 = diet	10	.38	.36	-	-	-
	6 = other	19	.63	.72	61	.41	.56
	MISSING DATA				4		
III-8a CURRCLM1	Was a specific curriculum used for intervention?	76	.68	.63	524	.39	.58
	0 = no	55	.59	.58	266	.37	.52
	1 = yes	21	.92	.71	258	.41	.64
	MISSING DATA	63			114		

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VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-8b STRCTR1	Degree of structure in instructional curriculum	66	.68	.66	535	.40	.57
	1 = very structured	8	.12	.60	95	.50	.62
	2 = somewhat	48	.76	.67	365	.39	.57
	3 = not structured	6	.67	.59	75	.29	.49
	4 = no instructional curriculum used	-	-	-	-	-	-
	MISSING DATA	73			103		
III-8c CNTRL1	Who controlled instructional activities?	70	.61	.65	581	.41	.56
	1 = mostly child controlled	7	.83	.46	75	.10	.31
	2 = mostly intervenor controlled	63	.59	.67	506	.46	.58
	MISSING DATA	69			57		
III-8d FOCUS1	Focus of educational intervention	78	.61	.64	609	.41	.56
	1 = language	9	.76	.54	36	.58	.36
	2 = self-help	-	-	-	5	.18	.35
	3 = motor	4	1.12	.89	6	-.57	.41
	4 = social-emotional	7	1.13	.72	27	.26	.34
	5 = behavioral	-	-	-	-	-	-
	6 = cognitive	1	.06	.00	90	.55	.67
	7 = combination	57	.50	.59	445	.39	.55
	8 = other	-	-	-	-	-	-
	MISSING DATA	61			29		
III-9 THERTCL1	Did program use a stated theoretical approach?	139	.53	.70	623	.41	.59
	0 = no	90	.54	.63	381	.44	.52
	1 = yes	19	.75	.68	137	.52	.70
	2 = comparison made that is not clear in III	30	.35	.86	105	.12	.57
	MISSING DATA				15		
III-10 PRNTCHD1	To whom was treatment delivered?	131	.53	.70	625	.41	.59
	1 = parent only	8	.25	.44	21	.78	.89
	2 = child only	77	.58	.77	377	.41	.60
	3 = parent and child together	13	.64	.46	126	.34	.51
	4 = parent and child separately	10	.35	.27	16	.67	.32
	5 = both parent and child but not clearly (3) or (4)	23	.47	.76	85	.40	.58
	MISSING DATA	8			13		
III-11 TOTHRPR1	Total hours of parent training	21	.32	.36	174	.35	.56
	1 = 0 - 5 hours	1	.54	.37	-	-	-
	2 = 6 - 10	6	.38	.42	18	.62	.47
	3 = 11 - 25	6	.30	.10	14	.54	.24
	4 = 26 - 50	2	.57	.56	40	.04	.54
	5 = 51 - 125	-	-	-	48	.38	.44
	6 = 126+	5	.09	.41	54	.43	.65
	MISSING DATA	118			464		

2-6.9

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-12a VSTSMO1	Average # of visits/month to parents to supervise/assist.	26	.36	.40	225	.35	.57
	1 = 0 - .5 visits/month	10	.42	.46	67	.45	.59
	2 = .6 - 1.0	-	-	-	7	.49	.17
	3 = 1.1 - 2.0	7	.18	.38	36	.36	.61
	4 = 2.1 - 4.0	1	.06	.00	18	.38	.58
	5 = 4.1 - 10.0	6	.51	.38	95	.24	.56
	6 = 10.1+	2	.36	.21	2	.41	.24
	MISSING DATA	113			413		
III-12b PARTRHR1	Average # of visits/month to parents to supervise/assist.	139	.53	.70	638	.42	.59
	1 = <1.0	127	.55	.72	528	.44	.59
	2 = 1.1 - 4.0	3	.52	.40	99	.32	.55
	3 = 4.1+	9	.21	.33	11	.33	.47
III-12c TYPEHOM1	Nature of home-based program	50	.38	.51	233	.35	.57
	1 = training family member as interventionist	41	.37	.55	161	.33	.56
	2 = tutoring in home by non-family	1	.06	.00	7	.70	.40
	3 = material/toy lending	-	-	-	1	.08	.00
	4 = health/social services	4	.44	.26	11	.43	.56
	5 = combination	4	.47	.26	53	.35	.61
	MISSING DATA	89			405		
III-12d WRITEPL1	Were parents given written plan of weekly activities?	37	.44	.58	188	.30	.58
	0 = no	13	.48	.42	98	.17	.61
	1 = yes	24	.42	.66	90	.44	.51
	MISSING DATA	102			450		
III-13a RATIO1	Child/intervenor ratio (applies only to classrooms)	52	.74	.70	337	1.32	.60
	1 = 1.0 # of children/# of intervenors	28	.80	.73	35	.61	.60
	2 = 1.1 - 4.0	13	.71	.86	62	.33	.57
	3 = 4.1 - 5.0	1	.53	.00	129	.30	.67
	4 = 5.1 - 8.0	1	.72	.00	47	.26	.57
	5 = 8.1 - 14.9	1	.16	.00	59	.27	.39
	6 = 15.0 - 20.0	-	-	-	5	-.08	.79
	7 = 20.1 - 50.0	7	.72	.38	-	-	-
	8 = 50.1+	1	.52	.00	-	-	-
	MISSING DATA	87			301		
III-13b SEGREG1	Degree of target child segregation	97	.59	.77	519	.43	.59
	1 = 1 to 1 intervention or with same type and severity	86	.55	.78	498	.44	.59
	2 = target child with other type and severity	6	1.14	.75	2	.86	.69
	3 = integrated with non-handicapped	5	.70	.32	19	.34	.46
	MISSING DATA	42			119		

		HANDICAPPED			DISADVANTAGED		
VARIABLE NAME	DESCRIPTION/CODES	# of data points (N)	ES	SD	# of data points (N)	ES	SD
III-14 VERIFY1	Degree to which treatment was implemented as planned	127	.53	.71	634	.41	.59
	1 = complete implementation	38	.46	.85	150	.37	.52
	2 = most of treatment implemented	75	.61	.68	478	.44	.60
	3 = only some of treatment implemented	14	.28	.31	6	-.57	.41
	MISSING DATA	12			4		
III-17 INVOLVE1	Degree of intended parent/family involvement	128	.56	.62	610	.41	.59
	1 = extensive	63	.49	.62	216	.38	.54
	2 = moderate	12	.29	.47	64	.31	.55
	3 = some	15	.32	.32	50	.56	.60
	4 = none	38	.84	.66	280	.42	.62
	MISSING DATA	11			28		
III-18 COMMIT1	Parents' commitment/cooperation for program	71	.43	.61	288	.37	.55
	1 = very positive	10	.63	.48	64	.32	.46
	2 = positive	52	.43	.66	190	.38	.58
	3 = ambivalent/negative	9	.19	.32	34	.38	.50
	MISSING DATA	68			350		
III-19 FUNDS	Funding for program	137	.52	.69	626	.41	.59
	1 = external funding for substantial portion	82	.42	.66	578	.39	.56
	2 = no or insignificant external funding	4	.27	.18	11	.95	.71
	3 = probably no external funding	51	.69	.73	37	.66	.86
	MISSING DATA	2			12		
III-20 CONTINU1	Continued intervention program after preschool	35	.55	.61	304	.25	.52
	0 = No	32	.53	.61	129	.38	.50
	1 = Yes, definitely	3	.69	.73	175	.16	.51
	MISSING DATA	104			334		
IV-1 DESIGN	Type of experimental design used	139	.53	.70	638	.42	.59
	1 = random assignment	28	.51	.58	326	.32	.50
	2 = non-random but good matching	12	.50	.64	81	.67	.63
	3 = convenience and/or poor matching	23	.45	1.06	106	.25	.63
	4 = pre/post unadjusted	39	.59	.71	20	.69	.91
	5 = pre/post adjusted	30	.50	.42	103	.63	.55
	7 = crossover	7	.75	.69	-	-	-
	8 = other	-	-	-	2	.62	.06

	VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
			# of data points (N)	$\overline{ES}$	SD	# of data points (N)	$\overline{ES}$	SD
IV-2	BLIND1	Blinding of data collector	139	.53	.70	638	.42	.59
		1 = yes, definitely	37	.50	.66	183	.45	.60
		2 = yes, probably	16	.72	.38	68	.19	.44
		3 = probably not	62	.53	.79	318	.41	.62
		4 = definitely not	24	.45	.64	69	.56	.44
IV-5	VALIDIDX	Overall index of study's internal validity	139	.53	.70	638	.42	.59
		1 = excellent	8	.55	.49	64	.35	.57
		2 = good	15	.31	.69	121	.43	.41
		3 = fair	28	.47	.55	226	.43	.59
		4 = poor	37	.45	.92	95	.20	.76
		5 = bad	51	.68	.59	132	.57	.53
V-1	DVCHDPAR	Outcome measured for:	139	.53	.70	638	.42	.59
		1 = target child	130	.54	.71	602	.41	.60
		2 = sibling of target child	4	.66	.35	-	-	-
		3 = non-sibling peer of target child	-	-	-	-	-	-
		4 = parent	5	.15	.23	36	.50	.34
V-4	TYPEMEAS	Construct measured by outcome variable	137	.53	.70	638	.42	.59
		1 = IQ verbal	1	-1.13	.00	5	.50	.42
		2 = IQ performance	-	-	-	6	.76	.29
		3 = IQ full scale	21	.73	.70	257	.43	.59
		4 = developmental quotient	25	.65	.76	23	.45	.67
		5 = fine motor	-	-	-	-	-	-
		6 = gross motor	7	.60	.48	3	1.06	1.65
		7 = motor combined	14	.35	.54	24	.30	.60
		8 = perceptual organization	3	.49	.31	12	.72	.51
		9 = expressive language	1	.97	.00	1	.77	.00
		10 = receptive language	3	.82	.95	74	.50	.47
		11 = articulation	-	-	-	-	-	-
		12 = combined or other language (not 9-11)	10	.67	.35	7	.41	.72
		13 = social functioning/adaptive behavior	18	.22	.97	4	.39	.21
		14 = interpersonal interaction	7	1.10	.73	7	.58	.35
		15 = ITPA	2	.93	.91	42	.65	.68
		16 = preacademic or academic	3	.48	.44	98	.21	.56
		17 = psychological/emotional functioning	2	.21	.09	6	.32	.26
		18 = self-concept	-	-	-	9	.13	.65
		19 = attitude	1	.39	.00	7	.32	.34
		20 = parenting skills	1	.21	.00	20	.48	.33
		21 = health status/physical growth	10	.23	.40	7	-.11	.11
		22 = school progress/placement	5	.74	.42	10	.44	.41
		23 = other	3	.14	.33	16	.47	.77
		MISSING DATA	2			0		

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VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	ES	SD	# of data points (N)	ES	SD
V-5 GENRLZTN	Generalization of skill across persons or settings	139	.53	.70	638	.42	.59
	1 = not a concern for this outcome	65	.51	.65	476	.40	.58
	2 = a concern, assessed well	-	-	-	5	.30	.14
	3 = a concern, assessed somewhat	22	.55	.55	37	.69	.78
	4 = a concern, not assessed at all	52	.55	.81	120	.40	.52
V-6 TYPEINST	Instrument	135	.52	.70	637	.42	.59
	1 = Opinion by parent or untrained person or involved professional	14	.39	.61	2	.69	.01
	2 = Opinion by clinician, teacher, or trained professional (uninvolved)	-	-	-	8	.33	.35
	3 = Interview, rating, or questionnaire	4	.47	.19	30	.50	.43
	4 = Unstandardized objective measure	14	.78	.60	13	.16	.35
	5 = Systematic observation	21	.73	.63	21	.44	.87
	6 = Standardized objective measure	73	.48	.78	553	.42	.59
	7 = Physical measurement	9	.19	.41	6	-.14	.07
	8 = Combination	-	-	-	4	.39	.21
	9 = Other, specify ________________	-	-	-	-	-	-
	MISSING DATA	4			1		
V-7 COLLECTR	Primary data collector/informant	95	.52	.73	383	.41	.64
	1 = Untrained paraprofessional or parent	14	.35	.45	-	-	-
	2 = Trained paraprofessional or parent	6	.64	.32	36	.69	.41
	3 = Professional but not likely to be trained by virtue of professional status	5	.33	.26	27	.42	.56
	4 = Professional specifically trained or likely to be trained by virtue of professional status	70	.55	.81	320	.37	.65
	MISSING DATA	44			255		
V-10 QLTYDV	General quality of outcome measure	139	.53	.70	638	.42	.59
	1 = excellent	57	.54	.82	292	.43	.66
	2 = good	52	.53	.64	294	.41	.51
	3 = fair	20	.50	.51	45	.33	.54
	4 = poor	4	.74	.66	6	.39	.30
	5 = bad	6	.44	.66	1	.68	.00
V-11 MOSINTI	Months after intervention was initiated outcome was measured	128	.53	.71	617	.41	.57
	1 = 0 - 3 months	30	.67	.57	25	.70	.71
	2 = 4 - 6	19	.59	.72	46	.57	.46
	3 = 7 - 12	34	.38	.84	166	.60	.62
	4 = 13 - 24	12	.31	.68	130	.41	.55
	5 = 25 - 36	11	.42	.59	77	.34	.43
	6 = 37 - 48	14	.57	.61	38	.56	.41
	7 = 49 - 72	6	1.15	.95	70	.16	.51
	8 = 73+	2	.34	.23	65	.01	.50
	MISSING DATA	11			21		

VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	$\overline{ES}$	SD	# of data points (N)	$\overline{ES}$	SD
V-12 MOSCOM1	Months after intervention was completed outcome measured	130	.53	.71	632	.42	.58
	1 = 0 months (immediate posttest)	118	.54	.70	373	.57	.59
	2 = 1 - 3 months	4	.13	.16	8	.49	.44
	3 = 4 - 6	1	-1.12	.00	3	.47	.20
	4 = 7 - 12	1	1.11	.00	75	.30	.52
	5 = 13 - 18	-	-	-	26	.32	.40
	6 = 19 - 24	2	.52	.48	36	.31	.38
	7 = 25 - 36	4	.90	.78	24	.28	.32
	8 = 37 - 48	-	-	-	31	-.10	.56
	9 = 49 - 60	-	-	-	7	.32	.57
	10 = 61 - 84	-	-	-	15	.28	.52
	11 = 84+	-	-	-	34	-.16	.39
	MISSING DATA				6		
VI-2 ESDATA	Data used to calculate mean difference Effect Size	139	.53	.70	638	.42	.59
	1 = $\bar{X}$'s & control group SD	77	.52	.70	268	.49	.59
	2 = $\bar{X}$'s & pooled SD	2	.37	.03	58	.12	.78
	3 = $\bar{X}$'s & published SD	29	.49	.84	178	.41	.43
	4 = t ratio, or F ratio from one-way ANOVA	1	.33	.00	24	.80	.76
	5 = t ratio from matched pairs t	11	.60	.51	8	1.15	.64
	6 = S of V table from n-way ANOVA	-	-	-	-	-	-
	7 = S of V table from ANCOVA or mixed model	-	-	-	-	-	-
	8 = ANCOVA F ratio	2	.39	.01	3	.50	.11
	9 = non-parametric test statistic except X^2	-	-	-	-	-	-
	10 = probability estimate from t or F	3	.99	.00	1	.63	.00
	11 = regression lines	-	-	-	-	-	-
	12 = proportions	6	.87	.51	12	.47	.28
	13 = X^2	5	.27	.39	-	-	-
	14 = other	3	.37	1.30	85	.22	.49
VI-3 MEANDATA	Scale of mean differences used for Effect Size	136	.54	.70	637	.42	.58
	1 = raw gain scores	76	.52	.66	282	.47	.66
	2 = residualized gain scores	-	-	-	-	-	-
	3 = covariance adjusted scores	-	-	-	20	.41	.39
	4 = final status measure	37	.43	.87	220	.37	.51
	5 = other	-	-	-	-	-	-
	6 = if #VI-2 coded 4-14	23	.77	.45	115	.39	.54
	MISSING DATA				1		
VI-5 CONCLSNS	Author's conclusions	135	.54	.69	634	.42	.58
	0 = not considered	-	-	-	2	.57	.47
	1 = intervention is effective	98	.64	.63	414	.56	.60
	2 = data equivocal about effectiveness	19	.22	.93	128	.13	.45
	3 = intervention not effective	18	.35	.58	90	.19	.42
	MISSING DATA	4			4		

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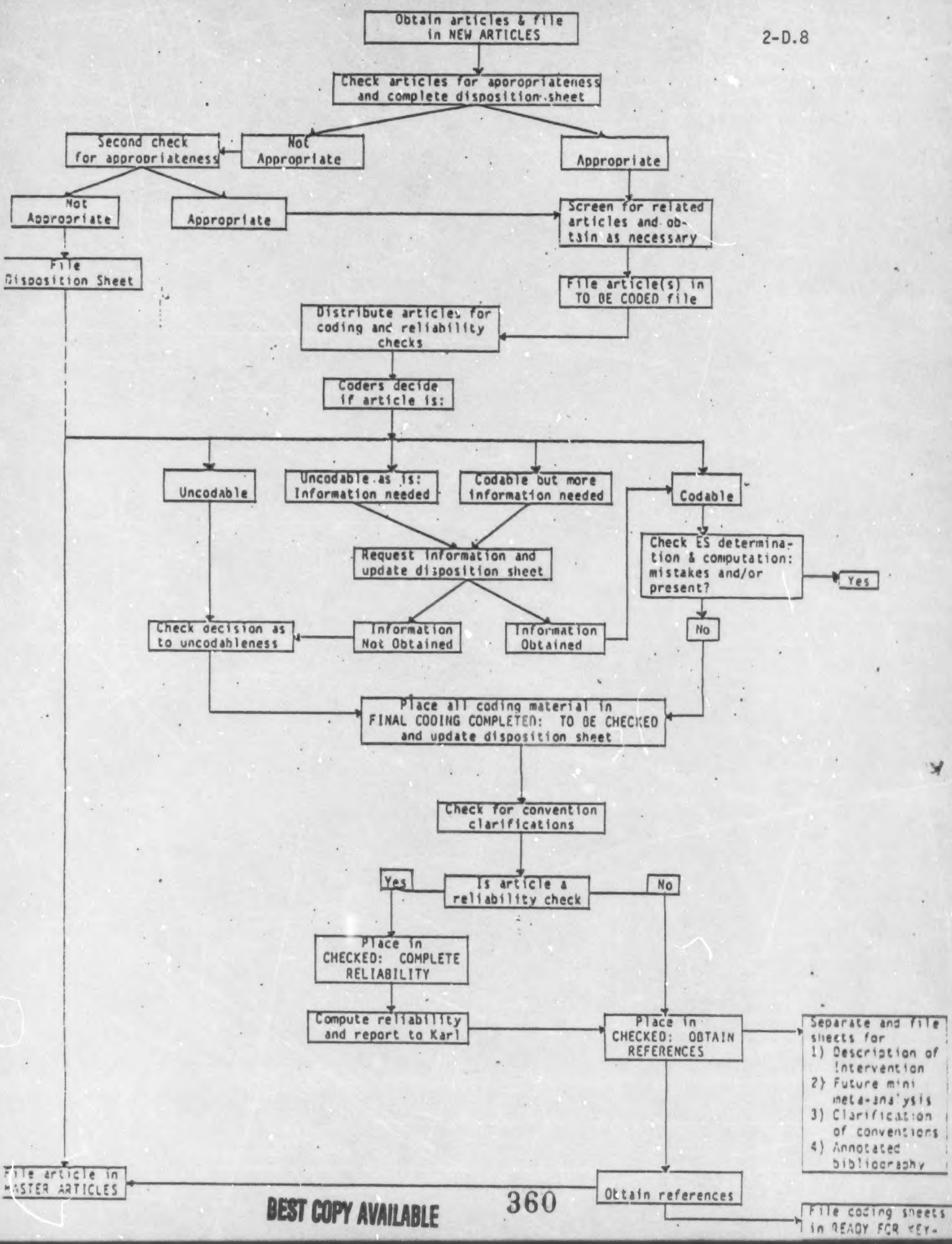
VARIABLE NAME	DESCRIPTION/CODES	HANDICAPPED			DISADVANTAGED		
		# of data points (N)	$\overline{ES}$	SD	# of data points (N)	$\overline{ES}$	SD
VI-6 COUNTRY	Country where study was conducted	133	.52	.70	632	.42	.59
	1 = USA	104	.55	.70	621	.42	.58
	2 = English-speaking non-USA	22	.41	.80	9	.42	.66
	3 = non-English speaking Europe	3	.60	.09	2	-.67	.02
	4 = non-English speaking Western Hemisphere	-	-	-	-	-	-
	5 = other	4	.47	.29	-	-	-
	MISSING DATA	6			6		
VI-7 PROFFSN	Professional affiliation of researcher/designer	84	.55	.71	408	.42	.64
	1 = education	11	.77	.48	3	1.34	1.18
	2 = special education	8	.58	.33	79	.39	.48
	3 = psychology	45	.65	.65	65	.73	.63
	4 = medical	15	.14	1.04	241	.33	.67
	5 = physical therapy	3	.02	.41	20	.44	.44
	6 = occupational therapy	-	-	-	-	-	-
	7 = speech therapy	2	.91	.23	-	-	-
	8 = nutrition	-	-	-	-	-	-
	9 = social work	-	-	-	-	-	-
	MISSING DATA	55			0		


Obtain articles & file in NEW ARTICLES
Check articles for appropriateness and complete disposition sheet
Not Appropriate
Appropriate
Second check for appropriateness
Not Appropriate
Appropriate
File Disposition Sheet
Screen for related articles and obtain as necessary
File article(s) in TO BE CODED file
Distribute articles for coding and reliability checks
Coders decide if article is:
Uncodable
Uncodable as is: Information needed
Codable but more information needed
Codable
Request information and update disposition sheet
Check ES determination & computation: mistakes and/or present?
Yes
No
Check decision as to uncodableness
Information Not Obtained
Information Obtained
Place all coding material in FINAL CODING COMPLETED: TO BE CHECKED and update disposition sheet
Check for convention clarifications
Yes
Is article a reliability check
No
Place in CHECKED: COMPLETE RELIABILITY
Compute reliability and report to Karl
Place in CHECKED: OBTAIN REFERENCES
Separate and file sheets for
1) Description of intervention
2) Future mini meta-analysis
3) Clarification of conventions
4) Annotated bibliography
File article in MASTER ARTICLES
Obtain references
File coding sheets in READY FOR KEY-

Appendix 3-A

Individual Child Data for Each Variable Used in Selected Matched Pairs

Matching Variables
Communicatively Disordered

Half Day

ID #	MONTHS			CA TEST DATE	SCORES FROM MINNESOTA CHILD DEVELOPMENT INVENTORY							
	AGE	HOME	CENTER		GEN. DEVEL.	GROSS MOTOR	FINE MOTOR	EXPR. LANG.	COMPRE. CONCEPT.	SITUA. COMPRE.	SELF HELP	PERSONAL SOCIAL
005652	71	- -	21	71	0	30	39	23	24	29	29	45
006776	60	- -	09	45	35	36	44	31	29	48	42	45
006716	66	- -	10	49	19	36	30	12	19	30	36	23
006049	56	- -	13	29	14	22	15	10	14	17	27	15
007067	52	- -	08	44	35	33	46	31	31	39	45	51
006871	49	- -	09	35	18	19	30	15	18	21	29	22
007035	46	- -	06	37	17	22	22	18	17	21	21	18
006965	45	- -	07	39	21	39	33	14	22	39	28	22
004834	68	6	25	25	13	12	20	13	17	20	15	19
005854	65	- -	19	35	22	24	27	22	15	18	27	22
006219	56	- -	14	33	24	24	33	22	23	28	42	27
MEAN	57.6	.5	12.8	37.2	21.9	26.4	29.3	19.2	20.8	28.2	31.0	28.1
SD	9.0	1.8	6.3	7.0	7.3	8.4	9.6	7.3	6.5	10.1	9.3	12.6

Full Day

ID #	MONTHS			CA TEST DATE	SCORES FROM MINNESOTA CHILD DEVELOPMENT INVENTORY							
	AGE	HOME	CENTER		GEN. DEVEL.	GROSS MOTOR	FINE MOTOR	EXPR. LANG.	COMPRE. CONCEPT.	SITUA. COMPRE.	SELF HELP	PERSONAL SOCIAL
060075	74	- -	19	52	31	48	35	24	31	51	38	36
060106	61	- -	10	45	30	48	48	24	27	31	45	33
040151	57	5	08	38	29	39	42	23	25	32	53	31
021835	54	- -	22	26	14	22	14	14	14	14	19	14
030095	50	7	10	24	15	18	22	11	17	20	22	21
040170	47	- -	06	38	21	25	30	18	22	36	35	21
050073	45	- -	22	17	12	12	10	12	12	11	11	11
070263	46	- -	07	38	18	19	22	15	15	28	24	25
070112	45	- -	21	16	11	11	12	10	14	11	13	14
040135	61	- -	12	41	32	26	36	30	34	39	45	27
030104	59	- -	12	39	24	24	31	23	22	36	37	31
MEAN	54.5	1.1	13.5	34.3	21.5	26.5	27.4	18.5	21.2	28.1	31.1	23.7
SD	8.9	2.5	6.2	11.6	8.0	13.0	12.5	6.6	7.4	12.8	14.0	8.2

Variable	Age	Home	Center	CA	GD	GM	FM	EL	CC	SC	SH	PS
P Value	.45	.84	.72	.43	.91	.98	.70	.83	.90	.98	.93	.34

Matching Variables
Mentally Disabled

Half Day

ID #	MONTHS			CA TEST DATE	SCORES FROM MINNESOTA CHILD DEVELOPMENT INVENTORY							
	AGE	HOME	CENTER		GEN. DEVEL.	GROSS MOTOR	FINE MOTOR	EXPR. LANG.	COMPRE. CONCEPT.	SITUA. COMPRE.	SELF HELP	PERSONAL SOCIAL
005794	70	- -	20	39	20	3	24	17	19	28	33	24
006650	65	- -	21	49	19	24	18	17	12	14	36	14
004286	64	- -	14	42	24	39	27	23	21	28	45	33
006226	62	- -	14	37	21	22	18	22	21	27	30	22
005413	63	7	13	31	16	06	18	20	22	20	16	19
006465	56	- -	22	36	24	45	22	22	23	20	33	23
006355	57	- -	13	37	21	22	27	14	20	27	39	14
005322	69	- -	14	29	14	17	18	13	14	14	18	15
006903	54	- -	09	39	27	27	33	26	26	28	42	27
006973	49	- -	08	40	21	42	24	18	23	42	34	23
007072	45	- -	04	36	23	48	31	24	20	30	30	20
006625	54	5	09	36	28	27	27	27	26	39	30	39
005700	69	- -	10	36	22	39	27	18	22	29	30	25
005027	67	- -	29	25	15	18	18	15	14	17	22	17
003788	68	13	22	36	15	17	18	15	14	19	16	17
MEAN	60.8	1.7	14.8	36.5	20.6	28.6	23.3	19.4	20.1	26.1	30.2	22.1
SD	7.8	3.8	6.7	5.5	4.3	12.2	5.2	4.4	3.9	8.2	8.9	7.0

Full Day

ID #	MONTHS			CA TEST DATE	SCORES FROM MINNESOTA CHILD DEVELOPMENT INVENTORY							
	AGE	HOME	CENTER		GEN. DEVEL.	GROSS MOTOR	FINE MOTOR	EXPR. LANG.	COMPRE. CONCEPT.	SITUA. COMPRE.	SELF HELP	PERSONAL SOCIAL
030094	71	- -	13	45	25	42	27	22	23	24	34	33
060093	69	- -	10	40	29	30	20	23	27	22	42	26
021978	65	- -	11	50	31	39	35	27	31	48	54	45
060097	63	- -	10	42	22	39	30	19	20	24	30	20
030107	65	- -	12	47	34	42	36	31	33	42	35	45
021847	76	- -	21	49	24	20	32	23	23	33	38	36
060074	56	4	14	23	15	13	20	17	19	24	16	29
040130	56	- -	14	31	15	19	12	15	14	14	19	17
070252	52	- -	09	38	22	19	15	22	23	19	22	21
040161	50	- -	07	34	23	39	30	19	22	39	42	26
060098	47	- -	09	27	15	13	18	17	21	14	20	21
040177	57	- -	06	48	30	48	34	28	25	33	48	39
021595	74	- -	28	31	18	24	24	18	15	29	30	22
070163	61	- -	21	29	15	20	36	13	12	20	25	20
070080	77	10	33	33	15	17	15	11	19	22	22	15
MEAN	62.6	.93	14.5	37.8	22.2	28.3	25.6	20.3	21.8	27.1	31.8	27.6
SD	9.5	2.7	7.8	8.7	6.6	12.6	8.4	5.6	5.8	10.0	11.4	9.8

Variable	Age	Home	Center	CA	GD	GM	FM	EL	CC	SC	SH	PS
P Value	.57	.71	.98	.64	.46	.94	.38	.61	.36	.76	.68	.08

Appendix 3-B

Individual Child Test Scores on the CAPER, Spring, 1983

OUTCOME DATA - SPRING 1983

COMMUNICATIVE DISABLED

HALF DAY

ID#	DATE GIVEN	GROSS MOTOR	FINE MOTOR	RECEPT. LANG.	EXPRES. LANG.	SOCIAL	SELF-HELP EATING	SELF-HELP D & G	SELF-HELP TOILET.	COGNI-TIVE
005652	5/31/83		90	97	76	96		96		85
006776	6/02/83			100	92					96
006716	5/31/83				72					90
006049	5/27/83		101		90					101
007067	5/31/83				80					101
006871	6/01/83	78		93	68					87
007035	5/20/83			118	66					106
006965	5/27/83			114	48					98
004834	5/31/83	72	95		76					
005854	5/31/83		102	93	84					91
006219	5/27/83				96					104

FULL DAY

ID#	DATE GIVEN	GROSS MOTOR	FINE MOTOR	RECEPT. LANG.	EXPRES. LANG.	SOCIAL	SELF-HELP EATING	SELF-HELP D & G	SELF-HELP TOILET.	COGNI-TIVE
060075	5/20/83		75	89	73	64				82
060106	5/17/83				100	87				106
040151	5/11/83				95	110				96
021835	5/25/83				123	127				115
030095	5/11/83	81			57	91				87
040170	5/13/83				62					102
050073	5/25/83	70		120	110	123		129		94
070263	3/22/83				90		109	91	136	105
070112	5/25/83	72		79	60			101	104	70
040135	3/21/83	86	105		103					104
030104	5/12/83			103	94					101

OUTCOME DATA - SPRING 1983

MENTALLY DISABLED

HALF DAY

ID#	DATE GIVEN	GROSS MOTOR	FINE MOTOR	RECEPT. LANG.	EXPRES. LANG.	SOCIAL	SELF-HELP EATING	SELF-HELP D & G	SELF-HELP TOILET.	COGNI-TIVE
005794	5/31/83	70			75	81		96		83
006650	6/01/83	79				89	99	99	92	85
004286	6/01/83		79	92	87		94	99	94	87
006726	6/01/83	74			84	94	97	99	97	87
005413	5/27/83	9	52				48	32	52	82
006465	6/01/83	92			103	109	114	115	107	101
006355	6/01/83	80		96	70					93
005322	5/03/83	38	72	78	68	81	87	77		72
006903	5/31/83	92				101	121	121	113	100
006973	6/01/83		55			47			82	62
007072	6/01/83			89	49	61			120	84
006625	5/23/83	65	57		89	105	79	90	98	78
005700	5/31/83	72		85	70	74	87	90		83
005022	5/31/83	37			33	37	12	58	70	50
003780	5/31/83	63			77	91	82	74		76

FULL DAY

ID#	DATE GIVEN	GROSS MOTOR	FINE MOTOR	RECEPT. LANG.	EXPRES. LANG.	SOCIAL	SELF-HELP EATING	SELF-HELP D & G	SELF-HELP TOILET.	COGNI-TIVE
030094	3/01/83		70		61					63
060093	5/20/83				77	69				77
021978	5/26/83	78	84	97	87	82	71	70	65	89
060097	5/20/83		83	80	85					82
030107	5/17/83	76	86							89
021847	5/26/83	56	86	83	59	67	82	61	73	76
060074	5/18/83		86		67			90	107	92
040130	5/09/83	38	51	36	37	55	77	73	82	40
070252	3/22/83	49	80		91				102	91
040161	5/20/83		89	64	27					64
060098	5/18/83	86	90		95				73	99
040177	5/10/83	82	79	61	71	100	80	111		70
021595	5/25/83			83	67	86				69
070163	3/22/83	81			86	92				92
070080	3/22/83	72			76	87				82

Appendix 3-C

Individual Child Costs for Several Summary Variables

INDIVIDUAL CHILD DATA
MENTALLY DISORDERED

HALF DAY

ID#	DI HOURS	$PER-SONNEL	$NON-PERSONNEL	$BUDGET	$CON-TRIBUTED	$TOTAL
030094	393	4542	1034	5576	1023	6599
060093	347	6583	2290	8873	1202	10075
021978	331	670	1535	8235	347	8582
060097	332	7031	2146	9177	793	9970
030107	288	3831	1023	4854	1329	6183
021847	314	6984	1477	8461	329	8790
060074	363	7503	891	8394	223	8617
040130	245	9181	1541	10722	1014	11736
070252	200	6062	1095	7157	1197	8354
040161	365	6971	2434	9405	513	9918
060098	376	6430	891	7321	223	7544
040177	274	5636	1771	7407	135	7542
021595	504	7012	1511	8523	1262	9785
070163	278	7925	957	8882	684	9566
070080	228	6435	1095	7530	1454	8984
$\bar{X}$	185.67	5208.20	1167.93	6376.13	376.00	6752.13
SD	45.55	856.06	96.25	920.08	365.23	986.42
TOTALS	2785.00	78123.00	17519.00	95642.00	5640.00	101282.00

FULL DAY

ID#	DI HOURS	$PER-SONNEL	$NON-PERSONNEL	$BUDGET	$CON-TRIBUTED	$TOTAL
005794	160	4877	1104	5981	157	638
006650	182	4575	1160	5735	125	5860
004286	183	4675	1160	5835	318	6153
006226	150	4379	1160	5539	413	5952
005413	272	7352	1389	8741	635	9376
006465	182	4711	1160	5871	557	6428
006355	169	4842	1160	6002	6	6008
005322	150	5146	1104	6250	356	6606
006903	189	4860	1160	6020	1205	7225
006973	171	5055	1045	6100	1060	7160
007072	241	5510	1160	6670	6	6676
006625	239	5857	1389	7246	433	7679
005700	117	4435	1104	5539	240	5779
005022	250	6795	1160	7955	6	7961
003788	130	5054	1104	6158	123	6281
$\bar{X}$	322.53	6588.40	1446.07	8034.47	781.87	8816.33
SD	75.84	1283.38	518.00	1476.11	459.95	1453.68
TOTALS	4838.00	98826.00	21691.00	120517.00	11728.00	132245.00

INDIVIDUAL CHILD DATA
COMMUNICATIVE DISORDERED

HALF DAY

ID#	DI HOURS	$PER-SONNEL	$NON-PERSONNEL	$BUDGET	$CON-TRIBUTED	$TOTAL
0060075	365	6971	2835	9806	1202	11008
060106	449	7325	891	8216	103	9719
040151	292	6000	1771	7771	135	7906
021835	378	6128	1189	7317	1259	8576
030095	354	4378	955	5333	711	6044
040170	284	5890	1771	7661	135	7796
050073	379	5839	1218	7057	7722	14779
070263	232	6509	1095	7604	428	8032
070112	405	6681	1258	7939	1260	9199
040135	181	5454	1541	6995	1597	8592
030104	347	4378	965	5343	339	5682
$\bar{X}$	203.73	6158.73	1393.73	7552.45	380.27	7932.73
SD	43.88	729.98	262.23	965.61	192.97	839.95
Totals	2241.00	67746.00	15331.00	83077.00	4183.00	87260.00

FULL DAY

ID#	DI HOURS	$PER-SONNEL	$NON-PERSONNEL	$BUDGET	$CON-TRIBUTED	$TOTAL
005652	111	4796	989	5785	632	6417
006776	182	6497	1640	8137	227	8364
006716	194	6696	1639	8335	227	8562
006049	238	7193	1639	8832	10	8842
007067	217	6544	1639	8183	444	8627
006871	221	5207	1160	6367	521	6888
007035	269	6578	1389	7967	221	8188
006965	254	5909	1389	7378	631	8009
004834	176	6180	1104	7284	472	7756
005854	174	5438	1104	6542	356	6898
006219	205	6628	1639	8267	442	8709
$\bar{X}$	333.27	5959.36	1408.09	7367.45	1481.00	8848.45
SD	78.63	949.60	564.87	1255.92	2139.38	2478.10
Totals	3666.00	65553.00	15489.00	81042.00	16291.00	97333.00

Appendix 3-D

Variable Description and Data Sources

IOWA DATA
VARIABLE DESCRIPTION
AND DATA SOURCES

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
1) ID	IDENTIFICATION NUMBER	A four- or five-digit number, assigned by the AEA, was utilized to identify each student.	AEA records
2) DOBM	DATE OF BIRTH MONTH	The month (indicated numerically) in which the child was born.	AEA records
3) DOBD	DATE OF BIRTH DAY	The day (indicated numerically) on which the child was born.	AEA records
4) DOBY	DATE OF BIRTH YEAR	The year in which the child was born.	AEA records
5) SEX	GENDER OF CHILD	Gender of child: 1: Male 2: Female	Teacher
6) HANDI	HANDICAP OF CHILD	The major handicap of the child. 01: Mentally Retarded 02: Deaf 03: Hard of Hearing 04: Visuallly Handicapped 05: Emotionally Disturbed 06: Orthopedic Handicap (Gross Motor) 07: Other Health Impaired (Epilepsy) 08: Specific Learning Disability 09: Multiple Handicap 10: Deaf/Blind 11: Speech Impaired	Teacher
7) MOHOM	MONTHS IN HOME-BASED PROGRAM	The number of months that the child received intervention while still in the home. After the child was identified as disabled, either the therapist or teacher was involved in establishing an in-home program of therapy for the child to be carried out in conjunction with the parents or responsible guardian.	AEA records
8) MOCEN	MONTHS IN CENTER-BASED PROGRAM	The number of months the child had been in the preschool for instruction and therapy.	AEA records Teacher

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
9) HRCEN	HOURS/WEEK IN CENTER	The average number of hours per week that the child spent in the preschool during the 1982-83 school year. This figure was derived from the regular weekly schedule information provided by the teachers. Once the hours per week figure was ascertained, that number was multiplied by the number of weeks in the school year, excluding the days during which there was no school.	Teacher
10) RTMI	ROUND TRIP MILES FROM CENTER TO HOME	The estimated number of miles the child traveled from home to the center and back.	Teacher
11) SERV	SERVICE	Indicate which type of preschool program the child is in by the following designation: 1 = 1/2 day program 2 = full day program	AEA
12) ST	SPEECH THERAPY	Whether or not the child is receiving any speech therapy: 0 = no speech therapy 1 = speech therapy	Teacher
13) PT	PHYSICAL THERAPY	Whether or not the child is receiving any physical therapy: 0 = no physical therapy 1 = physical therapy	Teacher
14) OT	OCCUPATIONAL THERAPY	Whether or not the child is receiving any occupational therapy: 0 = no occupational therapy 1 = occupational therapy	Teacher
15) HRHOMP	HOURS SPENT BY PARENTS IN PRE-SCRIBED THERA-PEUTIC INTERVEN-TION	The average number of hours spent by the parent or guardian of the child following the therapeutic directives of the teacher. This time includes both the hours reported by the teacher that the parent spends structured time with the child and the hoursthe teacher spends in the home providing instruction regarding intervention with the child. The teacher was able to provide this information based on parent self-report and degree of progress observed with the child.	Teacher

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
16) HRHOMS	HOURS SPENT BY STAFF IN THE HOME INSTRUCTING PARENTS ABOUT THERAPEUTIC INTERVENTION	The average number of hours spent per week by the teacher in the home of the child. During this time the teacher would illustrate both narratively and by example what kind of treatment program should be carried out by the parents. This information was reported by the teacher as a part of the regular weekly schedule data.	Teacher
17) TRANS	MODE OF TRANSPORT TO AND FROM CENTER	The usual means of transportation, as reported by the teacher, utilized by the child to travel to and from the school. The three categories are: 1: School Bus (Van) 2: Parents Transport 3: Both Bus and Parents	Teacher
		PERSONNEL TIME	
18) MAP	MUSIC, ART, & PE INSTRUCTION AND PREPARATION TIME	The amount of personnel time in hours spent in preparing and delivering music, art, and PE instruction. These data were gathered from the weekly schedule of instruction provided by the teacher. Hours per week were multiplied by the number of weeks of instruction accounting for days during which school was not held.	Teacher School calendar
19) TRANB	AMOUNT OF TIME REQUIRED TO DRIVE SCHOOL BUS	Data calculated for each child who utilized the bus as transportation to and/or from school: Round Trip Miles ÷ MPH (an average of 40 MPH was utilized) X Number of Days of School	Teacher School calendar
20) TCH	HOURS OF DIRECT INTERVENTION BY TEACHER	From the weekly schedule provided by the teacher, hours of direct intervention for each child were determined. Hours spent in a group with other children were prorated across children (e.g., 30 minutes with five children is calculated to be 6 minutes of DI with one child). The number of hours spent per week in this manner were multiplied by the number of weeks in the school year.	Teacher School calendar

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
21) AID	HOURS OF DIRECT INTERVENTION BY AIDE	From the aide's weekly schedule provided by the teacher, hours of direct intervention for each child were determined (prorated as with teacher). The number of hours spent per week in this manner were multiplied by the number of weeks in the school year.	Teacher School calendar
22) SPCH	HOURS OF DIRECT INTERVENTION BY SPEECH THERAPIST	From the weekly schedules provided by the teacher, hours of direct speech therapy intervention for each child were determined (prorated as with teacher). The number of hours spent per week in this manner were multiplied by the number of weeks in the school year.	Teacher School calendar
23) PTOT	HOURS OF DIRECT INTERVENTION BY PHYSICAL THERAPIST AND OCCUPATIONAL THERAPIST	From the weekly schedules provided by the teacher, hours of direct physical and occupational therapy intervention were determined (prorated as with teacher). The number of hours spent per week in this manner were multiplied by the number of weeks in the school year.	Teacher School calendar
		CONTRIBUTIONS	
24) CFAC	THE COST OF AEA (AREA EDUCATION AGENCY) SPACE	Since the AEA preschool administrators exist as an essential part of providing service to the preschool children, the office space they utilize is considered as an indirect cost of preschool operation. Hence the amount of space in square feet used for this purpose was ascertained from the information provided by the administrative staff. An average yearly rental cost for square foot of office space was then determined by contacting real estate agencies in the area and obtaining data on the current rate of renting office space in that vicinity (\$.41/ft^2). The number of square feet in the administrative facility (19,068 ft^2) was multiplied by the average square foot cost of office space (\$.41/ft^2) and a yearly cost was computed. That figure (\$7817.88) was then divided by the total number of preschool children served by the area education agency to obtain the cost per child of AEA office space (\$225/child).	AEA preschool administrators, Facility floor plans, Area real estate agents

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
25) CHOM	COST OF HOME SPACE USED BY PARENTS AND STAFF DURING DIRECT INTERVENTION (AT HOME)	Space at home is necessary for therapeutic intervention with the child to take place in that milieu. Since several preschool programs actively encourage and incorporate this type of intervention, this too is considered as a contributedcost. To estimate the cost of home space, 2 real estate agencies were contacted. Inquiries were made regarding the square foot size and rental price for a middle class home with 3 bedrooms and a total of 1000 sq. ft. The yearly cost of utilizing this space was determined by using the agents' estimations on the average cost for utilities ($100/mo) and rent for a one thousand sq. ft. home ($400/mo). By dividing this figure by the number of hours in one year (8760 hrs/yr), the cost per sq. ft. per hour was determined ($.0006849/sq. ft./hour). Based then upon an average size living room (typically used work space) (300 sq. ft.) and the number of hours reported by teacher for home intervention for each child (0-9 hrs), a cost for home space was determined. Formula: # of hours/week used X cost/sq. ft./hr X # of sq. ft. X # of weeks of program	Area real estate agents Teachers
26) CEQUIP	CONTRIBUTED EQUIPMENT	Not considered in this study	-
27) CPATR	PARENT TRANSPORTATION COST	For those children not transported by bus to the center, a contributed cost is incurred with the parent's time (opportunity) and vehicle operation. To determine this figure, the number of round trip miles for each child to travel to and from the school was multiplied by 23¢, thus providing a cost for vehicle operation and gasoline. Added to this figure was the cost for parent time determined by dividing the round trip miles by an average speed of 35 miles per hour (in town speed) and multiplying this figure by the salary per hour (average $5.04/hr) of a paraprofessional (market value of	Teacher Administrator or Principal (hourly paraprofessional rate) School calendar

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
		replacement cost) in that particular school district. Finally, this figure was multiplied by the number of school days during which this transportation was provided. The formula used is as follows: [(RT miles X 23¢) + (RT miles ÷ 35 MPH X Cost of Paraprofessional/hr)] X 180 school days	
28) CPALUN	COST OF LUNCH PROVIDED BY PARENT	Based upon information from the classroom teachers, the children in full-day programs who brought lunch from home were identified. This represents a contributed cost for the parent. The cost of an individual lunch was determined by obtaining the cost of a lunch in each school district. This cost was reported to be between 65¢ and 85¢, depending on the district. This cost/lunch then was multiplied by the number of school days in which a lunch was brought from home. In cases where parents were eligible for purchasing reduced cost lunches, only a percentage of each lunch was charged to the parent (average of $ /lunch), and the rest of the cost was absorbed by the federal government.	Teachers Administrators (cost of federally funded lunch program) School calendar
29) COTH	CONTRIBUTED TIME FROM STUDENT AIDES	In some of the preschool programs, students participated in providing direct intervention for college credit. Though aides are not paid by the school district for this experience, it represents a contributed cost as the instructors incorporate the students' services into part of the ongoing preschool program. This cost was determined by consulting the weekly schedule of both the student aide and the teacher. The hours of involvement were multiplied by the hourly rate of pay for a paraprofessional (average $5.01/hr) and then multiplied by the number of weeks during which the students were in the classroom.	Teachers Administrator (Paraprofessional salary)

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
30) CAPRTM	COST OF PARENT TIME TO CONDUCT DIRECT INTERVENTION	The time the parents spend in their home providing the prescribed therapeutic intervention with their children can also be determined to be a contributed cost. In ascertainig this yearly cost, the number of weekly hours spent with the child is multiplied by the number of weeks during the school year. This number of hours is multiplied by the hourly paraprofessional salary (average $5.04/hr) in that particular school district. This represents the contributed cost of parent intervention.	Teacher Administrator (Paraprofessional salary) School calendar
31) CGOVLUN	COST OF LUNCH PROVIDED BY FEDERAL FUNDS	Certain eligible children whose families are of low economic status are provided full or partial (50% to 100%) financial support for their lunch. To determine this contributed cost, the full or partial cost per lunch (32¢ to 85¢) is ascertained for each child receiving this support. This daily cost is multiplied by the number of school days the child receives lunch.	Teacher Administrator
32) CSNAK	COST OF PARENT CONTRIBUTED SNACKS	Teachers encourage parents to provide snacks for the children in both half-day and full-day programs. To determine the contributed cost of these snacks, either the snacks or the cost of snacks was ascertained from the teacher's report. For those that reported what the snacks were generally comprised of, a specific value was assigned those food stuffs by contacting the local supermarkets. After the weekly cost was determined, that figure was multiplied by the number of weeks in the school program and divided evenly among all the children in the classroom.	Teacher Food market
CARD #2			
1) ID2	IDENTIFICATION NUMBER	This identification number is the same for each child as indicated on the initial card.	AEA

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
		PERSONNEL COST	
2) PCDI	TOTAL PERSONNEL COST FOR DIRECT INTERVENTION	This represents the cost for each personnel who provided direct instruction (instructor, aide, therapists). The personnel time previously determined for each child for direct intervention by each of the above named providers is compiled by multiplying the personnel time spent with each child by their respective hourly salaries. This figure represents the cost of all direct intervention received by the child.	Teacher Administrator (for salaries)
3) PCPREP	TOTAL PERSONNEL COST FOR PREPARATION	This represents the cost for preparation for direct intervention by all those personnel (teacher, aide, therapist) who provide such. The personnel time required for each child for preparation is determined from each of the weekly schedules and multiplied by the number of weeks in the school year. This figure is multiplied by their respective salaries. Each of those amounts are then totalled to provide the total personnel cost for preparation.	Teacher Administrator (for salary) School calendar
4) PCTRV	COST (SALARY) FOR TEACHER AND THERAPIST WHILE TRAVELING	The amount of time spent traveling to children's homes for weekly visits (teachers) or to school districts by AEA therapists is determined from their weekly schedules. This time is multiplied by the number of weeks in the school year then by the hourly salary of each. These amounts are totalled to represent the cost for personnel during travel.	Teacher Administrator (for salary) School calendar
5) PCAD	COST FOR AEA - (AREA EDUCATION AGENCY) PERSONNEL FOR REGIONAL ADMINISTRATION	The number of hours spent weekly by the AEA administrative personnel in preschool related matters was provided by them. This weekly schedule was multiplied by the # of weeks they were involved in providing administrative services. The number of yearly hours was multiplied by their hourly salary and that amount was evenly distributed over each preschool child.	AEA Administrator

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
		PERSONNEL COST	
6) PCPAR	COST FOR TEACHER TIME IN INTERFACING WITH PARENTS	The number of hours each teacher spent with parents was provided in their weekly schedule. This number was multiplied by number of weeks in the school year. This total number of hours was then multiplied by the respective salary of each teacher.	Teachers Administrator (for salaries) School calendar
7) PCSCAD	COST FOR RIVERSIDE SCHOOL ADMINISTRATION	Each school had some administration costs (see Non-DI) assigned to the preschool for principal and secretary. However, at Riverside (half-day program) the preschool program had a coordinator in addition to the principal. This additional cost for coordinator's time and secretary's time is calculated in these columns. Total hours were multiplied by the number of weeks in the school year, then by the hourly salary of the coordinator and secretary. The total cost was then distributed evenly over each child in the half-day program.	Teacher Administrator School calendar
8) PCSCRE	COST FOR TEACHER TIME IN SCREENING CHILDREN IN PRESCHOOL PROGRAM	The number of hours AEA personnel were engaged in screening activity was provided on their schedules. This number of hours was multiplied by their hourly salary and evenly distributed over each child in the AEA.	AEA Administrator
9) PCINS	COST FOR TEACHER TIME IN RECEIVING TRAINING AND PARTICIPATING IN INSERVICE	The number of hours the teachers engaged in this activity was provided both on their schedules and on the school calendar. After the yearly number of hours was determined, it was multiplied by their hourly salary rate and distributed evenly as cost over each child in that classroom.	Teacher School calendar Administrator
10) PCBUS	COST FOR TIME BUS DRIVER SPENDS TRANSPORTING CHILDREN TO AND FROM CENTER	The number of hours obtained previously in determining the time required to transport those utilizing bus service was multiplied by the hourly salary of the bus driver for each child.	Teacher Administrator School calendar

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
11) PCCAPER	COST FOR THE TEACHER TO CONDUCT EVALUATION OF STUDENT PROGRESS (CAPER)	The number of hours indicated on the teacher's schedule for CAPER administration was multiplied by the hourly salary rate for that teacher and that cost was distributed evenly over all children in that classroom.	Teacher Administrator
		NONPERSONNEL COSTS	
12) TRANSC	COST OF BUS OPERATION AND TRAVEL REIMBURSEMENT FOR THERAPISTS, CONSULTANTS, AND TEACHERS	The cost of operating the school bus per mile was determined by contacting a local bus company contracted for those services ($.06/mi/child). The number of round trip miles for each child was multiplied by that cost for each of the non-Riverside preschool sites. For Riverside that cost was multiplied by the total number of round trip miles for all children and divided evenly over each child. Travel reimbursement for therapists, consultants, and teachers was based upon $.23/mi.	Bus company Teacher
13) EQPC	COST OF EQUIPMENT PER CLASSROOM	An inventory of classroom equipment for each classroom was provided by either the teacher or principal/administrator. The cost of this equipment was provided in this inventory. Where the cost was not provided, the depreciated value of classroom equipment was ascertained by contacting local merchants of that equipment. Salvage value was used for items that were depreciated completely. The cost for individual items in each classroom was then totalled and distributed evenly over the number of children using the classroom.	Teacher Principal/Administrator Retail sales
14) FACC	COST OF FACILITY INCLUDING MAINTENANCE AND INSURANCE	Cost of each facility was either provided by the administrator (in terms of cost to rent/yr) or determined by contacting local real estate appraisers who could provide an estimate of yearly rental cost for each facility. Information regarding the proportion of the entire facility utilized by the particular class under study was provided by the individual teacher. That proportion of square footage was multiplied by the	Administrator Real estate appraisers Teacher

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
		previously obtained cost/sq. ft. of the facility. That same proportion was utilized in determining cost of insurance and maintenance, figures which were provided by the administrator. The proportional cost of facility, insurance and maintenance was totalled and that cost was divided evenly over each child in that particular classroom.	
		DIRECT INTERVENTION COSTS	
15) DIMAP	DIRECT INTERVENTION COSTS FOR EACH CHILD FOR MUSIC, ART, & PHYSICAL EDUCATION INSTRUCTION	The amount of direct intervention with each child was obtained from the weekly schedules provided by classroom teachers. The number of hours per week of these activities was multiplied by the respective hourly salary rates. That amount was multiplied by the number of weeks of instruction during the year.	Teacher Administrator School calendar
16) DITCH	DIRECT INTERVENTION COSTS FOR EACH CHILD FOR PRIMARY TEACHER INSTRUCTION	The number of hours of direct intervention provided each child by the primary teacher as indicated on the weekly schedule was multiplied by the hourly salary rate of that particular teacher. That amount was multiplied by the number of weeks of instruction during the year.	Teacher Administrator School calendar
17) DIAID	DIRECT INTERVENTION COST FOR EACH CHILD FOR TEACHER AIDE INSTRUCTION	The number of hours of direct intervention provided each child by the aide as indicated on the weekly schedule was multiplied by the hourly salary rate of that particular aide. That amount was multiplied by the number of weeks of instruction during the year.	Teacher Administrator School calendar
18) DISPH	DIRECT INTERVENTION COST FOR EACH CHILD FOR SPEECH THERAPY	The number of hours of direct intervention provided each child by the speech therapist as indicated by the weekly schedule was multiplied by the hourly salary rate of that particular speech therapist. That amount was multiplied by the number of weeks of instruction during the year.	Teacher Administrator School calendar

CODE VARIABLE	VARIABLE	EXPLANATION OF DATA AND METHOD OF DATA COLLECTION	SOURCE
19) DIPOT	DIRECT INTERVENTION COST FOR EACH CHILD FOR OCCUPATIONAL AND PHYSICAL THERAPY	The number of hours of direct intervention provided each child by the physical and/or occupational therapist as indicated by the weekly schedule was multiplied by the respective hourly salary rates of those therapists. That amount was multiplied by the number of weeks of instruction during the year.	Teacher Administrator School calendar
20) NONDI	COST FOR SERVICES OF PRINCIPAL AND SECRETARY OF THAT FACILITY WHERE PRESCHOOL CLASSES WERE HELD	Yearly salaries for both the principal and secretary of the school where the preschool was held were obtained from the administrator of each school district. The proportion of preschool children to total number of children in the school was utilized in determining the amount of each salary required for administration of the preschool. This amount was then divided evenly over the number of children in the preschool.	Administrator Principal
21) CONTRAV	COST FOR THE CONSULTANT TO THE PRESCHOOL TO TRAVEL TO AND FROM THAT SCHOOL	The number of hours during which the consultant traveled to and from each preschool as indicated by the weekly schedule was multiplied by the hourly salary rate of that consultant. That amount was multiplied by the number of weeks of instruction during the year and distributed evenly over each child in that particular preschool.	Teacher Administrator School calendar
22) CONIN	COST FOR THE CONSULTANT TO THE PRESCHOOL TO PROVIDE INSERVICE	The number of hours during which the consultant provided inservice to the teacher and aide of the preschool as indicated by the consultant's weekly schedule was multiplied by the hourly salary rate of that consultant. That amount was multiplied by the number of weeks of instruction during the year and distributed evenly over each child in that particular preschool.	Teacher Administrator School calendar
23) CONEVAL	COST FOR THE CONSULTANT TO THE PRESCHOOL TO CONDUCT STUDENT EVALUATIONS	The number of hours during which the consultant conducted student evaluations as indicated by the consultant's weekly schedule was multiplied by the hourly salary rate of that consultant. That amount was multiplied by the number of weeks of instruction during the year and distributed evenly over each child in that particular preschool.	Teacher Administrator School calendar

Appendix 3-E

Means and Standard Deviations for Each Cost Variable

3-E.2

IOWA
CD ONLY

VARIABLE	ALL (N = 22)		HALF (N = 11)		FULL (N = 11)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
C. AGE	56.2727	8.9612	57.9091	9.1701	54.6364	8.8687
MONTHS IN HOME B.	.8182	2.1300	.5455	1.8091	1.0909	2.4680
MOS. IN CENTER B	14.1818	6.5366	14.6364	7.2563	13.7273	6.0513
HOURS PER WK. CENTER	21.6773	9.2168	13.4727	.8673	29.8818	5.4360
RT MILES	13.6364	6.7862	10.6364	4.1297	16.6364	7.7366
HOME HOURS PER WK. PARENT	2.068[illegible]	2.1493	1.4727	.8650	2.6636	2.8588
HOME HOURS PER WK. STAFF	.0364	.1217	.0000	.0000	.0727	.1679
HRS. OF MUSIC, ART, & PE	2.5455	2.5019	4.4545	.8202	.6364	2.1106
HRS. OF INDIV. BUS DRIVING TIME	47.9545	32.9509	46.5455	24.1965	49.3636	41.1127
DI HOURS OF TEACHER	98.2273	52.4676	58.8182	15.1909	137.6364	46.1893
DI HOURS OF AIDE	87.9091	60.9605	50.4545	29.6188	125.3636	61.9714
DI HOURS OF ST	26.2273	12.6413	33.7273	11.8498	18.7273	8.4509
DI HOURS OF PTOT	5.6364	11.0950	9.7273	14.7044	1.5455	2.3394
CONTRIBUTED COST OF HOME SPACE	15.0000	16.3328	9.6364	4.9249	20.3636	21.7406
CONTRIBUTED COST OF PARENT TRANS.	173.6364	369.7780	46.2727	153.4693	301.0000	477.3940
CONTRIBUTED COST OF LUNCH - PARENT	44.7727	61.1578	.0000	.0000	89.5455	58.6896
CONTRIBUTED OTHER	27.5455	70.9525	.0000	.0000	55.0909	94.3541
CONTRIBUTED COST OF PARENT TIME	630.9091	1482.9527	316.1818	184.2481	945.6364	2089.5868
CONTRIBUTED COST OF LUNCH GOVT.	18.6364	48.4705	.0000	.0000	37.2727	64.5726
CONTRIBUTED COST OF SNACK PARENT	20.1364	36.1719	8.1818	1.8878	32.0909	49.2919

VARIABLE	ALL (N = 22)		HALF (N = 11)		FULL (N = 11)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
PERSONNEL COSTS						
DI	2118.3636	533.2670	2000.8182	365.1761	2235.9091	658.3570
PREP	671.4091	193.3929	758.4545	127.2292	584.3636	213.7411
TRAVEL	439.6818	231.1972	379.0909	127.2261	500.2727	296.6247
ADMIN-AEA	1655.0000	.0000	1655.0000	.0000	1655.0000	.0000
PARENT CONTACT	89.8182	101.0684	95.0000	109.1467	84.6364	97.3604
RIVERSIDE - AD	142.2727	151.9064	284.5455	62.4680		
SCREENING	1.3636	3.5125	.0000	.0000	2.7273	4.6710
INSERVICE	73.0000	22.3522	76.1818	25.2064	69.8182	19.7880
BUS DRIVING	255.4545	157.3720	285.8182	115.5550	225.0909	191.7276
CAPER	135.9091	76.1533	149.6364	48.4794	122.1818	97.0246
NC COSTS						
TRANSPORTATION	144.7727	147.2251	104.5455	34.6738	185.0000	201.8802
EQUIPMENT	440.4091	210.0600	544.4545	132.5499	336.3636	226.4453
FACILITIES	590.7273	182.3597	519.7273	113.7393	661.7273	214.0299
DI COSTS						
MUSIC, ART, PE	33.2273	35.1432	59.7273	23.4695	6.7273	22.3118
PT/OT	64.0455	121.2496	101.1818	161.6006	26.9091	41.5246
AIDE	465.2273	224.0689	436.6364	215.1350	493.8182	239.4848
ST	328.7727	166.2095	375.3636	194.5981	282.1818	138.4260
TEACHER	1235.1818	519.6575	1042.9091	86.4227	1427.4545	691.5866
NON DI COSTS	321.5909	101.8139	359.0000	.0000	284.1818	136.7112
CONSULTANTS						
TRAVEL	74.5000	53.7434	31.1818	13.7755	117.8182	41.8039
INSERVICE	71.5909	81.3573	84.0000	114.8939	59.1818	18.9885

VARIABLE	ALL (N = 22)		HALF (N = 11)		FULL (N = 11)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
EVALUATION	9.0909	19.7386	.0000	.0000	18.1818	25.2262
HOURS/YR THERAPY	31.8636	17.5344	43.4545	16.7115	20.2727	8.4154
HOURS/YR INSTRUCTIONAL STAFF	220.5455	92.1287	157.1818	44.5305	283.9091	83.7155
HOURS/YR ALL STAFF	268.5000	[illegible].8650	203.7273	43.8819	333.2727	78.6309
CONTRIBUTIONS - PARENT	84.4545	1549.6866	380.2727	192.9674	1388.6364	2108.7283
TOTAL CONTRIBUTIONS	1155.6364	1585.7319	605.2727	192.9674	1706.0000	2139.3759
TOTAL PERSONNEL	5582.2727	819.0678	5684.5455	709.4587	5480.0000	939.4084
NON-PERSONNEL	1175.9091	429.8180	1168.7273	262.2301	1183.0909	564.8746
TOTAL DI	2126.4545	522.3702	2015.8182	339.2344	2237.0909	656.5207
TOTAL CONSULTANT	155.1818	98.4526	115.1818	118.9738	195.1818	51.7722
TOTAL	8069.0000	1893.7257	7573.7273	839.9482	8654.2727	2507.1601
TOTAL COSTS	177,518		83,311		94,207	

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3-E.5

VARIABLE	ALL (N = 30)		HALF (N = 15)		FULL (N = 15)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
C. AGE	61.6333	8.7197	60.8000	7.9391	62.4667	9.6427
MONTHS IN HOME	1.3000	3.2605	1.6667	3.7922	.9333	2.7115
MONTHS IN CENTER	14.6667	7.1743	14.8000	6.7210	14.5333	7.8364
HOURS PER WK. CENTER	22.2667	9.2180	13.7867	1.1307	30.7467	4.5433
RT MILES	11.1000	5.3600	9.6667	4.0999	12.5333	12.6596
HOME HOURS PER WK. PARENT	2.1133	2.1866	1.6200	1.7628	2.6067	2.5050
HOME HOURS PER WK. STAFF	.1500	.3972	.0000	.0000	.3000	.5278
HRS. OF MUSIC, ART, & PE	2.8333	2.6403	4.7333	.7988	.9333	2.4631
HRS. OF INDIV. BUS DRIVING TIME	41.5333	42.5609	40.5333	22.5574	42.5333	56.9321
DI HOURS OF TEACHER	108.1000	51.7283	69.3333	23.6995	146.8667	41.9606
DI HOURS OF AIDE	82.6667	61.2948	51.4667	30.8658	113.8667	68.8755
DI HOURS OF ST	12.5000	12.9528	11.4000	12.9494	13.6000	13.3138
DI HOURS OF PTOT	6.4667	12.7028	8.2000	15.9428	4.7333	8.5813
CONTRIBUTED COST OF HOME SPACE	15.6667	16.3840	11.4000	12.4028	19.9333	19.0581
CONTRIBUTED COST OF PARENT TRANS.	97.7000	226.8038	39.2667	152.0791	156.1333	275.8793
CONTRIBUTED COST OF LUNCH - PARENT	51.3667	69.5208	.0000	.0000	10 2.7333	66.0113
CONTRIBUTED OTHER	6.7333	36.8800	.0000	.0000	13.4667	52.1562
CONTRIBUTED COST OF PARENT TIME	380.3667	364.3799	319.0667	306.6821	441.6667	415.8402
CONTRIBUTED COST OF LUNCH GOVT.	16.1667	42.2114	.0000	.0000	32.3333	55.9536
CONTRIBUTED COST OF SNACK PARENT	10.9333	5.7110	6.2667	.7037	15.6000	4.5166
PERSONNEL COSTS						
DI	2151.9000	789.4186	1694.2000	545.2627	2609.6000	738.0103
PREP	591.2667	228.0888	581.3333	144.5504	601.2000	294.3786

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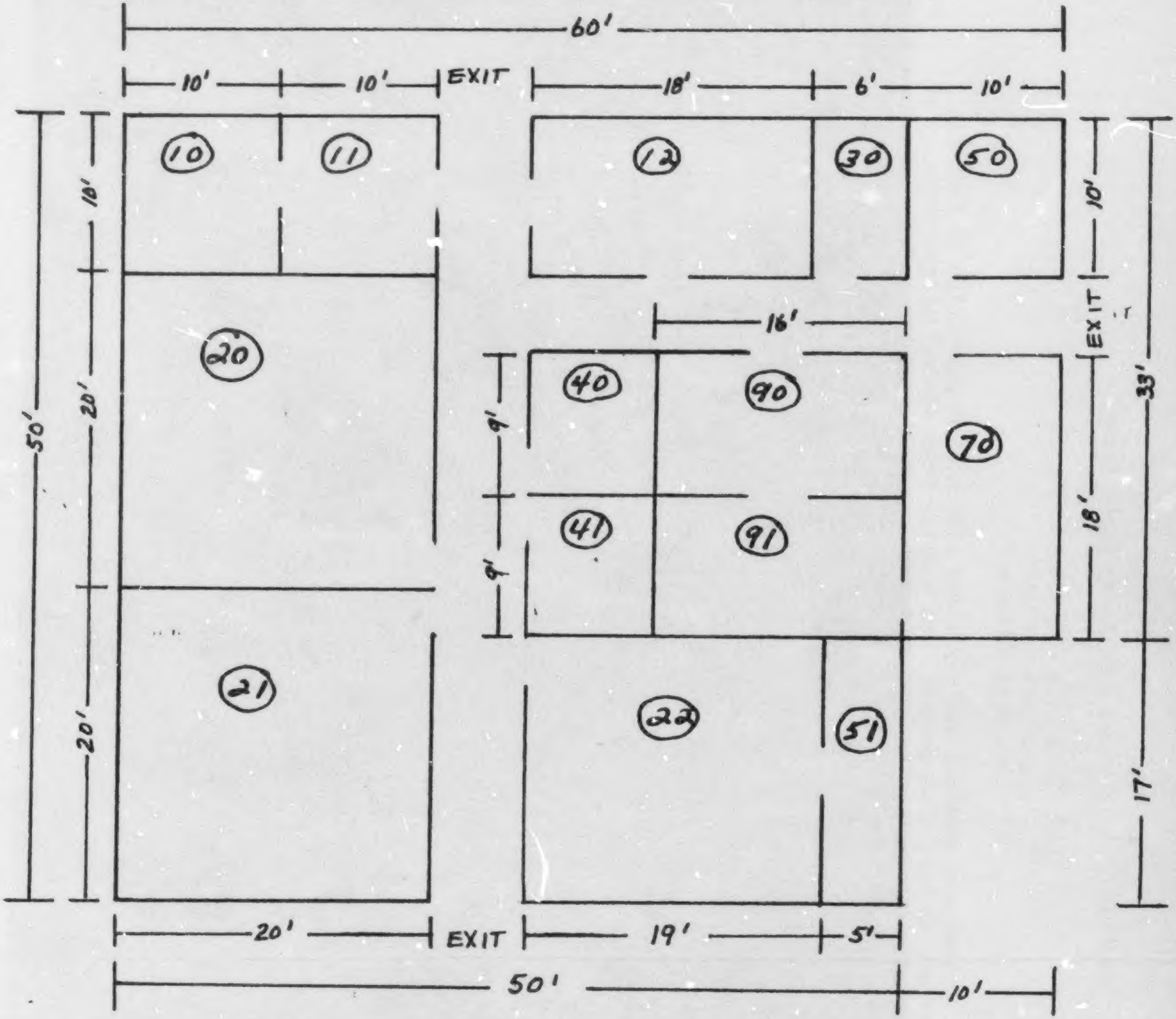
VARIABLE	ALL (N = 30)		HALF (N = 15)		FULL (N = 15)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
ADMIN-AEA	1655.0000	.0000	1655.0000	.0000	1655.0000	.0000
PARENT CONTACT	57.2000	88.9360	.0000	.0000	114.4000	96.8148
RIVERSIDE - AD			230.0000			
SCREENING	.6667	2.5371	.0000	.0000	1.3333	3.5187
INSERVICE	62.8667	23.6872	48.6000	19.1714	77.1333	358.5524
BUS DRIVING	229.1333	197.2792	248.9333	141.9479	209.3333	244.1901
CAPER	128.9333	75.3840	94.5333	32.1511	163.3333	90.5646
NC COSTS						
TRANSPORTATION	111.0333	104.3170	107.3333	29.6929	114.7333	147.0726
EQUIPMENT	421.0333	168.2909	421.4000	48.4028	420.6667	237.3258
FACILITIES	549.9333	243.4331	414.2000	41.7462	685.6667	285.5353
DI COSTS						
MUSIC, ART, PE	40.2667	36.2595	70.6667	8.0682	9.8667	26.0381
PT/OT	87.5667	190.2299	89.0667	232.0442	86.0667	145.2940
AIDE	413.3333	256.5867	322.3333	164.5660	504.3333	302.5708
ST	163.1000	184.8519	130.2000	172.9142	196.0000	196.3732
TEACHER	1451.2000	691.1789	1090.1333	287.3365	1812.2667	792.2470
NON DI COSTS	328.7333	94.5979	359.0000	.0000	298.4667	128.7389
CONSULTANTS						
TRAVEL	62.1667	69.5052	10.2667	13.7137	114.0667	63.6154
INSERVICE	57.7667	77.3031	49.4667	108.5231	66.0667	21.2954
EVALUATION	6.6667	17.2873	.0000	.0000	13.3333	22.8869

MD ONLY

VARIABLE	ALL (N = 30)		HALF (N = 15)		FULL (N = 15)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
HOURS/YR THERAPY	18.9667	18.2312	19.6000	19.5733	18.3333	17.4506
HOURS/YR INSTRUCTIONAL STAFF	212.5997	91.8937	145.1333	52.5953	280.000	70.5813
HOURS/YR ALL STAFF	254.1000	92.8604	185.6667	45.5548	322.5333	75.8390
CONTRIBUTIONS - PARENT	556.0333	444.8373	376.0000	365.2287	736.0667	455.0258
TOTAL CONTRIBUTIONS	803.9333	457.3070	601.0000	365.2287	1006.8667	459.9454
TOTAL PERSONNEL	5442.9667	1229.2514	4789.4667	785.3824	6096.4667	1264.1566
NONPERSONNEL	1082.0000	392.4449	942.9333	96.2537	1221.0667	517.9963
TOTAL DI	2155.4667	784.8301	1702.4000	539.4693	2608.5333	738.2571
TOTAL CONSULTANT	126.6000	119.2348	59.7333	119.8460	193.4667	74.1975
COST	7455.5000	1609.2904	6393.1333	986.4154	8517.8667	1404.6797
TOTAL COSTS	223,665		95,897		127,768	

FORM 1.81

SAMPLE FLOOR PLAN



60'
10'
10'
EXIT
18'
6'
10'
10
11
12
30
50
10'
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20'
16'
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EXIT
33'
9'
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41
91
18'
21
22
51
20'
17'
20'
EXIT
19'
5'
50'
10'

The So Good Child Development Center

Introduction to

SECTION II

Cost Data

Section II is divided into three subsections:

1.0 Cost Data Collection
2.0 Cost Data Analysis
3.0 Cost Data Summary

Forms are provided and explained within each subsection so that the user may gather, disaggregate, and examine from several perspectives, the cost data from each alternative program under consideration. The information collected and analyzed in subsections 1.0 and 2.0 will be handled separately for each site under the various program alternatives. In subsection 3.0, all alternatives will be combined into single forms for summary and comparison.

Introduction to

SUBSECTION 1.0

Cost Data Collection

All forms included in the package labeled SUBSECTION 1.0 are data collection forms for use by persons who collect cost data at the site level. Data collected on FORMS 1.0 will be analyzed using package and summarized with other program alternatives using FORMS 3.0.

The attached FORM 1.0 , indicates the title of each form, specifies the person who typically will provide the information, and the number of forms to be completed at each site. One entire set of FORMS 1.0 will be used to collect data for each site within each program alternative.

CONTENTS OF COST DATA COLLECTION
(SECTION II)

SUBSECTION	FORM	TITLE	PAGE NUMBER
1.0	1.0	Introduction to Cost Data Collection	
1.1		Personnel Expenses	
	1.11	Staff Salary/Demographics	
	1.12	Consultant Schedule	
1.2		Staff Schedules	
	1.21	Weekly Schedule - Direct Service	
	1.22	Weekly Schedule - Indirect Service	
	1.23	Exceptions to Weekly Schedule	
1.3	1.30	Child Demographics	
1.4		Transportation of Children	
	1.41	Child Transportation Data	
	1.42	Vehicle Expenses	
	1.43	Parent Reimbursement	
1.5		Equipment	
	1.51	Classroom Equipment	
	1.52	Administration Equipment	
	1.53	Equipment Costs	
1.6		Staff Travel	
	1.61	Home Service Schedule	
	1.62	Staff Reimbursement	
1.7		Other Expenses	
	1.71	Telephone	
	1.72	Supplies	

CONTENTS OF COST DATA COLLECTION
(SECTION II)

SUBSECTION	FORM	TITLE	PAGE NUMBER
1.8		Facilities	
	1.81	Floor Plan	
	1.82	Facilities Costs	
1.9		Contributions	
	1.91	Parent Intervention Time-Home/Cen.	
	1.92	Parent Transportation of Child	
	1.93	Parent Food	

FORM 1.0

DATA COLLECTION

FORM NUMBER	TITLE	WHO PROVIDES INFORMATION?	HOW MANY FORMS WILL BE COMPLETED AT EACH SITE?
1.11	Staff Salary/Demographics	Administrator	1 per site
1.12	Consultant Schedule	Administrator & Secretary	1 per site
1.21	Staff Schedule Direct Service	Each staff who provides some direct intervention weekly	1 per direct service provider
1.22	Staff Schedule Indirect Service	Each staff who provides no direct intervention weekly	1 per indirect service provider
1.23	Exceptions to Weekly Schedules	Each staff who provides no direct intervention weekly	1 per indirect service provider
1.3	Child Demographics	Administrator, Secretary, or Teacher	1 per teacher
1.41	Child Transportation Data	Teacher	1 per teacher
1.42	Vehicle Expenses	Administrator/Secretary	1 per vehicle
1.43	Parent Reimbursement	Administrator/Secretary	1 per site
1.51	Classroom Equipment	Teacher	1 per room
1.52	Administration Equipment	Secretary	1 per room
1.53	Equipment Costs	Administrator	1 per site
1.61	Home Service Schedule	Home Visitor	1 per visitor
1.62	Staff Reimbursement	Administrator/Secretary	1 per site
1.7	Other expenses	Administrator	1 per site
1.81	Floor Plan	Secretary	1 per site
1.82	Facilities Cost	Administrator	1 per site
1.9	Contributions	All Staff	1 per staff

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FORMS 1.1

PERSONNEL EXPENSES

The personnel forms are divided into two sections:

FORM 1.11 Staff salary/demographics - persons who are employed on an hourly, weekly, monthly, or yearly basis.

FORM 1.12 Consultant schedule - nonstaff who receive compensation for a specific service performed once or infrequently during the school year (e.g., substitute teachers, psychologists, therapists, content area specialists, speakers, evaluators, tax specialists).

DIRECTIONS FOR

FORM 1.11

STAFF SALARY

Fill in the name of the site. List each paid staff person on Form 1.1 according to the directions below for filling in each column.

A. STAFF NAME

List the first and last name for each paid staff person who works for and is paid by this program, either full of part time. Do not include those staff who work entirely for another program, such as Head Start. Typically, staff will include the following:

director
administrator
head teacher
teacher
paraprofessional
aide
home visitor
board member
bookkeeper
secretary
clerk
OT
PT
speech therapist
nurse
bus driver
custodian
food service worker

B. POSITION

Give a descriptive title for each staff person. For instance, use "bookkeeper" instead of "administrative assistant" if that is the major function performed.

C. HIGHEST DEGREE

Indicate the last educational degree earned and the field of endeavor. For example, list B.S.-Special Education or H.S.-Vocational. Also include any special certifications received, such as preschool certificate.

D. YEARS EXPERIENCE

Indicate the number of years the person has performed related tasks. For instance, a teacher might have 2 years elementary and 1 year preschool teaching with handicapped children. An administrator might have 2 years regular teaching and 1 year as public school principal.

E. FTE (Full Time Equivalent)

Indicate the portion of Full Time Equivalent (FTE) for which each person is hired. If time is divided between two or more programs, list the FTE allotted to only this project. A full time person would be "1.0", a half-time person, ".5", and a person working 10 hours a week (10/40), ".25".

F. SALARY: PER

List the compensation earned for the largest contractual unit. For example, if a teacher is hired for a 10-month period, salary might be listed as "$15,000/10 mo." An aide paid by the hour might be listed as "$6.00/1 hr." For staff who work only partially for this program (and the rest of the time for another project), list only the salary paid by this program.

G. PERIOD OF EMPLOYMENT

List the expected length of service to your program, by month and day, for the current funding year. For hourly workers who are hired for the school year; time period should be from the beginning to the end of the program (school year).

H. EXPECTED WAGES

Indicate total amount of money (in wages) to be paid from the beginning of the funding year to the end of the funding year. Do not include fringe benefits.

I. BENEFITS

List the percentage of salary or the actual amount of fringe benefits for the school year. Include FICA, health, life, and dental insurance. List other benefits (e.g., tax sheltered annuities, workman's compensation, unemployment) in the other column. Remember that part time employees often receive reduced or no benefits.

J. TOTAL SWB

Add together columns H and I to compute the total salary, wages, and benefits (SWB).

FORM 1.11

STAFF SALARY/DEMOGRAPHICS

Site ____________________

A	B	C	D	E	F		G		H	I					J
							PERIOD OF EMPLOYMENT			BENEFITS					
STAFF NAME	POSITION	HIGHEST DEGREE	YEARS EXPERIENCE	FTE	SALARY	PER	FROM	TO	EXPECTED WAGES FOR YEAR	FICA	HEALTH	LIFE	DENTAL	OTHER	TOTAL SWB

DIRECTIONS FOR

FORM 1.12

CONSULTANT SCHEDULE

This form is used to indicate nonstaff persons who received compensation for services rendered.

A. Consultant Name. List the name of the consultant hired.

B. Type of Service. Indicate what type of service the consultant performed for the program (e.g., assessment, therapy, tax service, inservice, building, repair).

C. Length of Service. Give the number of days of service or indicate when service started and ended. If service has not been completed, estimate the date of completion.

D. Expected Service Days. Indicate actual or estimated number of 8 hour days or parts of days for which the consultant will be paid.

E. Expected Compensation. List the total amount of money paid to the consultant for services. If part of the services was donated, include that time on FORM 1.97, Contributions.

F. Specific Children. If the consultants work directly related to only specific children (e.g., psychological assessment or inservice with only their teacher), then indicate the ID numbers of the children involved.

FORM 1.12

Site ______________________

CONSULTANT SCHEDULE

A Consultant Name	B Type of Service	C Length of Service	D Expected Service Days	E Expected Compensation	F Specific Children (ID #s)

FORMS 1.2

STAFF SCHEDULES

To estimate the number of staff hours spent per year on various aspects of the program, staff are asked to complete two forms: weekly activities and exceptions to weekly activities. Separate weekly activities forms are provided for two groups of staff: Direct service staff, FORM 1.21 and indirect service staff, FORM 1.22.

Direct service staff are defined as anyone in direct contact with a child (e.g., instruction, transportation, therapy) for any part of the week. Indirect service staff do not intervene with the children in any way and are usually administrators and clerks.

Weekly activity forms should be filled in to illustrate the activities of a typical week. Activities which occur on a biweekly or monthly schedule should be prorated and the amount of time for only one week can be included on the weekly schedule.

The exceptions, FORM 1.22, to the weekly schedule include holidays and events at the beginning and end of the school year. At these times, the children will attend the center, but no formal intervention is being conducted. Instead, most time is devoted to pre- and posttesting or to large group activities.

DIRECTIONS FOR

FORM 1.21

WEEKLY SCHEDULE - DIRECT SERVICE

To specify the type of activities which staff are usually involved with throughout the year, each direct service provider completes a weekly schedule. Place staff name (or ID #) at the top of each page. Use one FORM 1.21 if your schedule is generally the same every week. If weekly activities vary slightly, list the activities usually engaged in for a typical week. If you work on a monthly schedule (e.g., home visitor), then fill out four FORM 1.21 's to show how time is spent during a typical month. Do not include activities associated with other projects (e.g., Head Start); indicate only intervention conducted for the project being analyzed.

Code FORM 1.21 in the order of categories as listed below. Follow the directions and definitions in entering information. A sample FORM 1.21 has been included to illustrate how time can be divided into blocks. Follow the steps below.

A. First, at the top of the form, indicate all the children with whom you interact during a typical week. List children by initials and ID #. Either initials or ID # can be used to complete the weekly schedule. Check to make sure that all initials are unique. That is, if two children have the same initials, use a middle initial to distinguish one from the other.

B. Time slots have been left blank to accommodate variance across program time schedules. Fill in the row labeled "Time" according to the schedule used by the program. For example, if children switch activities every 20 minutes and school starts at 8:30, the time column would look like this for Monday.

DAY	MONDAY	TUESDAY
Time	8:30-8:50	8:30-9:00
Room Exceptions		
Activity		
Time	8:50-9:10	9:00-9:20
Room Exceptions		
Activity		

If 8:30 and 9:00 on Tuesday are devoted to large group activity, then use a 30-minute time block (see example). Time blocks do not have to be the same everyday. If time blocks are the same each day, draw an arrow through the blocks to the right (see sample). Not all time blocks will be used everyday and they do not have to agree across the top.

C. Next, indicate on the space labeled "Room Number" (at the top of the form) the room in which most of the activities take place. Room numbers can be obtained from FORM 1.81 . If there are exceptions to the room given, list the room used with each time block in the schedule. For example, on the sample form, Smith used Room 2.2 most of the day, but 2.1 from 2:30-3:00 and 3:30-4:00 on Monday through Thursday. Use an arrow through blocks to the right to show that the room indicated is an exception everyday.

D. Finally, place the activity in each block of time. Activities should be indicated according to the categories below. Use arrows to show the same activity taking place across several days.

1. DIRECT INTERVENTION

Do not list the words "Direct Intervention". Instead, fill out the time schedules using the ID number (or initials) of each child who is physically in the presence of the instructor for the time block used. If all children who are listed at the top are in the group for a particular time block, write the word "all" instead of listing ID #s. If only one of the all group is missing, write "all but 11111"/see sample).

a. For intervention in the center—include the time spent with child for teaching or supervising.

b. For intervention in the home—include any time spent in the home: alone with child, with both parent and child, or alone with parent. Always signify home intervention by this notation H . Without this notation, indicated time will be assumed as center intervention.

2. TRAVEL—Refers to travel for home visits and for center-related activities that occur on a weekly basis and pertain to particular children. Always show the child's ID# in the space labeled "Travel". For example, include personnel time for staff who drive a van to transport children between their homes and the center. Indicate the ID #s of those children who ride the van during the indicated times. Do not include travel from home to work. Note that travel in conjunction with activities other than home visitations and transporting children should be included with that activity.

3. PREPARATION—refers to activities that support "Direct Intervention", for example, preparation of materials, working up lesson plans, organizing room, preparing food, daily recordkeeping, daily clean-up, and writing child specific reports. Also included are "staffings" (meetings with several staff for the purpose of planning curriculum for a specific child). If some kids require more time than others (e.g., severe require more time than moderate), then prorate preparation time according to an estimated ratio.

4. TEACHER AD (ADMINISTRATION)--refers to activities typically conducted by teachers, specialists, and other direct service providers. These activities are usually non-supervisory and consist mostly of general staff meetings and routine paper work. Remember that IEP or lesson preparation work should be coded under "Preparation" and not "Administrative Activities".

5. CENTER AD (ADMINISTRATION)—refers to activities usually associated with the day-to-day operation of running a preschool center. Activities which are supervisory (of direct service providers and other staff) in type should be coded under this heading.

Personnel Actions
Supervision of Direct Service
Public Relations
Program & Staff Evaluations
General Reports

Budget Management
Advisory Board Meetings
Purchasing
Staff Meetings
Bookkeeping
Directors' Meetings

Interagency Activities
Program Planning
Dissemination
Correspondence & Communication
Report Writing
Administrative Travel

6. REGIONAL AD (ADMINISTRATION)--refers to activities usually associated with the day-to-day operation of directing regional preschool activities. These activities consist of supervising supervisors and administrative personnel (bookkeepers, secretaries, etc.). The activities listed under 5 above (Center Administration) are also examples of activities to code under "Regional Administration". Travel in conjunction with these activities should be added to

total time. For example, if a board meeting is held 60 miles away from home, once a month for two hours, put 1 hour a week on schedule (2 hours travel + 2 hours meeting ÷ 4 weeks = 1 hour).

7. INSERVICE - refers to receiving and conducting inservice training. For example, if a teacher or an aide attends a signing class once a week for an hour, this activity would be coded "Inservice". If a therapist trains classroom teachers by modeling intervention during class, code this time as inservice for the therapist.

8. ASSESSMENT (comprehensive evaluation and screening of children)--refers to weekly scheduled assessment and testing of children. Do not include daily assessment of enrolled children that is used to determine IEP progress (this activity would be part of instruction and should be coded under "Direct Intervention").

9. PARENT--refers to regularly scheduled parent training and IEP meetings, excluding visits in conjunction with home program. Also include short unscheduled meetings which occur frequently throughout the year. For these, estimate the time per week for a typical week and record during the time slot usually used. For instance, if you usually talk to parents by phone once or twice a week, estimate the average time and list it on the day(s) it usually occurs (see example).

10. CUSTODIAL--refers to janitorial work performed on any section of the facilities. Do not include daily straightening up or organization jobs typically done by a teacher. Usually, this category will be used by the school custodian to indicate weekly activities. However, teachers who do their own custodial work (wash floors, clean bathrooms) should use this category.

11. NON-PROGRAM--includes activities not funded by project, for instance, Day Care time or Head Start time.

12. LUNCH--code this if staff lunch is eaten separately from children or from meetings. If supervising children during lunch, code as "Direct Intervention". If holding meetings during lunch, code as "administration".

DIRECTIONS FOR

FORM 1.22

WEEKLY SCHEDULE - INDIRECT SERVICE

To specify the type of activities which staff are usually involved with throughout the year, each direct service provider completes a weekly schedule. Place staff name (or ID #) at the top of each page. Use one FORM 1.22 if your schedule is generally the same every week. If weekly activities vary slightly, list the activities usually engaged in for a typical week. Do not include activities associated with other projects (e.g., Head Start); indicate only intervention conducted for the project being analyzed.

Code FORM 1.22 in the order of categories as listed below. Follow the directions and definitions in entering information. A sample FORM 1.22 has been included to illustrate how time can be divided into blocks. Follow the steps below.

A. Time slots have been left blank to accommodate variance across program time schedules. Fill in the row labeled "Time" according to the schedule used by the program.

B. Next, indicate on the space labeled "Room Number" (at the top of the form) the room in which most of the activities take place. Room numbers can be obtained from FORM 1.81 . If there are exceptions to the room given, list the room used with each time block in the schedule. For example, on the sample form, Smith used Room 2.2 most of the day, but 2.1 from 2:30-3:00 and 3:30-4:00 on Monday through Thursday. Use an arrow through blocks to the right to show that the room indicated is an exception everyday.

C. Finally, place the activity in each block of time. Activities should be indicated according to the categories below. Use arrows to show the same activity taking place across several days.

1. CENTER AD (ADMINISTRATION)—refers to activities usually associated with the day-to-day operation of running a preschool center. Activities which are supervisory (of direct service providers and other staff) in type should be coded under this heading.

    Personnel Actions
    Supervision of Direct Service
    Public Relations
    Program & Staff Evaluations
    General Reports
    Budget Management
    Advisory Board Meetings
    Purchasing
    Staff Meetings
    Bookkeeping
    Directors' Meetings
    Interagency Activities
    Program Planning
    Dissemination
    Correspondence & Communication
    Report Writing
    Administrative Travel

2. REGIONAL AD (ADMINISTRATION)—refers to activities usually associated with the day-to-day operation of directing regional preschool activities. These activities consist of supervising supervisors and administrative personnel (bookkeepers, secretaries, etc.). The activities listed under 5 above (Center Administration) are also examples of activities to code under "Regional Administration". Travel in conjunction with these activities should be added to total time. For example, if a board meeting is held 60 miles away from home, once a month for two hours, put 1 hour a week on schedule (2 hours travel + 2 hours meeting ÷ 4 weeks = 1 hour).

Initials	ID#

FORM 1.21

WEEKLY SCHEDULE - DIRECT SERVICE

Site

Staff Name

Room Number

Initials	ID#

DAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	OTHER
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						

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3. INSERVICE - refers to receiving and conducting inservice training. For example, if a teacher or an aide attends a signing class once a week for an hour, this activity would be coded "Inservice". If a therapist trains classroom teachers by modeling intervention during class, code this time as inservice for the therapist.

4. ASSESSMENT (comprehensive evaluation and screening of children)—refers to weekly scheduled assessment and testing of children. Do not include daily assessment of enrolled children that is used to determine IEP progress (this activity would be part of instruction and should be coded under "Direct Intervention").

5. PARENT—refers to regularly scheduled parent training and IEP meetings, excluding visits in conjunction with home program. Also include short unscheduled meetings which occur frequently throughout the year. For these, estimate the time per week for a typical week and record during the time slot usually used. For instance, if you usually talk to parents by phone once or twice a week, estimate the average time and list it on the day(s) it usually occurs (see example).

6. CUSTODIAL—refers to janitorial work performed on any section of the facilities. Do not include daily straightening up or organization jobs typically done by a teacher. Usually, this category will be used by the school custodian to indicate weekly activities. However, teachers who do their own custodial work (wash floors, clean bathrooms) should use this category.

7. NON-PROGRAM—includes activities not funded by project, for instance, Day Care time or Head Start time.

8. LUNCH—code this if staff lunch is eaten seperately from children or from meetings. If supervising children during lunch, code as "Direct Intervention". If holding meetings during lunch, code as "administration".

FORM 1.22

WEEKLY SCHEDULE - INDIRECT SERVICE

____
Site

____
Staff Name

____
Room Number

DAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	OTHER
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						
TIME						
ROOM EXCEPTIONS						
ACTIVITY						

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DIRECTIONS FOR

FORM 1.23

EXCEPTIONS TO WEEKLY SCHEDULE

Most activities conducted outside of the weekly schedule are pre and post program activities with the enrolled children (e.g., testing, group activities), screening, or inservice. Since direct instruction is not taking place on a daily basis, the weekly schedule does not define staff time allocation. Administrators, bookkeepers, and secretaries, however, who may not change their type of work, can describe their work using only the weekly schedule. Most direct intervenors will need to complete an exception form according to the following directions.

A. List the dates that the weekly schedule begins and ends.

B. List the dates that employment with the program begins and ends.

C. List all the holidays during period of employment.

D. List the approximate number of days in which various activities occur before and after the weekly schedule applies. Categorize activities by using the following definitions.

1. Preprogram activities - where staff supervise enrolled children who are not involved in direct service. Usually occurs at the beginning of the year when children participate in large group activities while others are being tested.

2. Postprogram activities - same as "preprogram activities" except activities occur at the end of the program year, rather than the beginning.

3. Screening - large-scale testing designed to provide a quick evaluation of a number of children. Usually scheduled at the beginning of or just prior to direct service.

4. Assessment testing - includes large-scale testing of enrolled children to establish a handicapping condition or annual progress, usually pre and posttesting.

5. Inservice training - Refers to any training received by any staff during contracted working time outside of direct service hours. Include travel to other locations (for inservice purpose) in the time spent on inservice.

FORM 1.23

EXCEPTIONS TO WEEKLY SCHEDULE

____
Site

____
Staff Name

A. Inclusive dates for weekly schedule: From ________ to ________

B. Inclusive dates during which staff is employed: From ________ to ________

C. List holidays occurring during entire period of employment.

________	________	________	________	________
________	________	________	________	________
________	________	________	________	________

D. List activities which occur prior to and after weekly schedule is implemented.

	Dates	Days
1. Preprogram activities (with children)	____	________
2. Postprogram activities (with children)	____	________
3. Screening	____	________
4. Assessment/testing	____	________
5. Inservice/training	____	________
6. Other: ________________	____	________
7. Other: ________________	____	________
8. Other: ________________	____	________

FORM 1.3

Child Demographics

The information requested will assist in analyzing the cost data at the individual child level and will provide a accurate description of the sample of children being served by the program.

DIRECTIONS FOR

FORM 1.30

CHILD DEMOGRAPHICS

Complete FORM 1.30 by following the directions below for each column.

A. CHILD ID#

List all students who are enrolled in the classroom by ID #.

B. BIRTH DATE

Give the month, day, and year when each child was born by using the respective columns (e.g., 11:10:80).

C. SEX

Code the sex of each child as M = male and F = female.

D. ROUND TRIP MILES

Indicate the approximate number of round trip miles between center and home.

E. HANDICAPPING CONDITION

Code the primary and secondary handicap of each child. The primary handicap should be consistent with the category to which the child has been designated for funding purposes. The secondary handicap may not be recorded but clearly impacts on the child's ability to perform. Use the following abbreviations for both primary and secondary handicaps.

MR	Mentally Retarded	ORTHO	Orthopedic Handicap
DF	Deaf	OHI	Other Health Impaired
HH	Hard of Hearing	LD	Specific Learning Disability
VI	Visually Handicapped	MULTI	Multiple Handicap
EMOT	Emotionally Disturbed	DB	Deaf/Blind
		SI	Speech Impaired

F. CLASSIFIED HEALTH PROBLEMS

List any special classifications as indicated below:

No health problem
Blind
Hard of Hearing
Deaf
Cerebral Palsy
Epilepsy
Muscular Dystrophy
Diabetes
Asthma
Heart Impairment
Hyperactivity
Polio
Arthritis
Cleft Lip and/or Palate
Chronic Sinus Infection
Chronic Respiratory
Spinal Bifida
Obesity
Tuberculosis
Other neurological
Terminal/degenerative
Hydrocephalic
Microcephalic
Multiple Sclerosis
Cystic Fibrosis
Chronic Strep Infection
Other
Down's Syndrome

G. INITIAL DATE OF SERVICE

Indicate the date when each child started the home, center, and/or mixed program. For instance, a child who received home services for 2 years, then began a mixed program this year, would be coded:

HOME			CENTER			MIXED		
9	21	80				9	8	82

H. CENTER SERVICE

Indicate the typical length of time each center-based child spends at the center daily. Check either the "Full" day, "1/2" day, or "1 hr" column. For a child who attends the center facilities once or twice a week for special services, check the "1 hr" box.

FORM 1.30

Site

CHILD DEMOGRAPHICS

Teacher

A	B	C	D	E		F	G			H		
Child ID#	Birth Date	Sex	Rd Tp Miles	Handicapping Condition		Classified Health Problems	Initial Date of Service			Center Service		
				Primary	Secondary		Home	Center	Mixed	Full	1/2	1 hr

FORMS 1.4

Transportation of Children

This section will provide the data needed to complete the yearly individual child cost of transportation from home to the center for services. Included are provisions for transportation provided by program owned vehicles, leased vehicles, or parents (who are reimbursed).

Directions for

FORM 1.41

Child Transportation Data

This form will collate data on children transported to a center facility by a vehicle owned or leased by the program or by parents. Each teacher should fill out one form.

A. Child ID #

B. RT miles. Indicate the round trip miles from home to center.

C. Trips per year. Estimate the number of days the child will attend school during year and multiply times two.

D. Type of service. Indicate what type of transportation is provided to the child using the following categories. If a child used more than one type of service, indicate all types and frequency of use.

TC	transportation company
PR	parent reimbursed
PC	parent contributed

E. Vehicle number. Give an identification number of vehicle either owned, leased, or contracted that coincides with number given on FORM 1.42 .

FORM 1.41

Child Transportation Data

Site

Teacher

A CHILD ID#	B RT MILES	C TRIPS PER YEAR	D TYPE OF SERVICE	E VEHICLE NUMBER

Directions for

FORM I.42

Vehicle Expenses

This form will summarize all the information needed to compute a per child cost for bus or van service. One form should be completed for each vehicle. Use a school designated number or assign one for purposes of data collection.

A. Vehicle type

Provide all relevant descriptive data.

B. Cost of vehicle

Provide as many pieces of information that are available.

C. Use of vehicle

Explain any details to show the full extent of vehicle use during the fiscal year.

D. Transportation company

Describe the specifics of any transportation service that is contracted from a private business. Indicate cost per child per mile.

FORM I.42

VEHICLE EXPENSES

Site ______________ Vehicle Number ______________

A. Vehicle Type__________ Make_________ Model_________ Year_______

Seating Capacity_____ Air Cond _____ Motor Size _______

B. Cost of Vehicle

________ Lease Cost	________ Insurance	________ Date Purchased
________ Depreciation Value	________ Maintenance	________ Purchase Price
________ Salvage Value	________ Gas	________ Estimated life span
________ Assessed Value		

C. Use of Vehicle During Year

Total number of children riding per day _______
Total number of preschool handicap children riding per day _______
Average miles per day _______

D. Transportation company (use this space if vehicle is contracted on a per child basis). Indicate how costs are derived and any schedules for service fluctuations.

____
____
____
____

FORM 1.43

Directions for Parent Reimbursement

Use this form to record any cost to program for parents who are reimbursed for transporting their child to and from the center for service.

FORM 1.43

Parent Reimbursement

Site ______________________

Parent Name	REIMBURSEMENT DATE	Child ID#	VOUCHER #

DIRECTIONS FOR

FORM 1.50

EQUIPMENT

The equipment form is used by each teacher (or intervenor) to determine the cost (or worth) of all major pieces of equipment used by the program. To be considered on this form, equipment must have a new or present value of $250 or more and a life expectancy of two years or more. Typical examples of equipment include:

- Typewriters
- Word processors
- Adaptive physical therapy devices
- Food preparation equipment
- Computers
- Copiers
- Playground equipment
- P.E. equipment
- Custodial equipment
- Audio-visual equipment
- Safety equipment
- Office furniture
- Major curriculum packages

Directions for completing each column in FORM 1.50 are explained below.

A. Equipment Name and Description

List the brand name and description of each piece of equipment, e.g., Sylvania - color television - with remote control - 19 inch.

B. Serial and/or Model #

List the identifying serial, model, or manufacturing numbers. If possible, also list the date of manufacture. Model may also be a name.

C. Frequency of Use

Consider which child or children use or benefit directly from the equipment most frequently. Indicate with a check mark "✓" the level of most frequent use by a child or children (e.g., daily; 3/wk = 3 or more times per week but less than daily; 1/wk = one or more times per week but less than 3/wk; 2/mos = 2 times per month but less than 1/wk, etc.).

D. Child ID #s

List the ID #s of any child or children who use the equipment at the frequency which you just indicated in Column C. If all the children in your classroom or group use (or benefit from) the equipment approximately the same frequency, write "All" in Column D. For example, the illustration below shows a Sony (brand name) portable cassette recorder (descriptive name) being used 3/wk by all the children in the class. Next, a Jacuzzi heat bath is listed with a frequency of "daily" for children #s 1234, 5678, 9101, and 1121. The same Jacuzzi heat bath is also used with other children (3141, 5161, 7181) but at a lower frequency (1/wk).

FORM 1.51

Teacher Name:

CLASSROOM EQUIPMENT

Site Name:

A	B	C								D
EQUIPMENT NAME & DESCRIPTION	Serial #/or Model #	FREQUENCY OF USE								CHILD ID #s
		Daily	3/Wk	1/Wk	2/Mos	1/Mo	6/Yr	3/Yr	1/Yr	

FORM 1.52

ADMINISTRATION EQUIPMENT

Site Name: ____________________

A	B		C USER		
EQUIPMENT NAME & DESCRIPTION	SERIAL # OR MODEL #	OFFICE	Site Name:	Site Name:	Site Name:

A EQUIPMENT NAME & DESCRIPTION	B Serial #/or Model #	C FREQUENCY OF USE								D Child ID #s
		Daily	3/Wk	1/Wk	2/Mos	1/Mo	6/Yr	3/Yr	1/Yr	
Sony - Portable Cassette Tape Recorder	Model = Super 124 Serial # = 123456									All
Jacuzzi - Portable Heat Bath 100 Gallon	Model= Deluxe 77 Serial # = A69124									1234 5678 9101 1121
"	"									3141 5161 7181

Continue to list all the pieces of equipment used by your children, indicating the frequency of use by which children.

FORM 1.53

EQUIPMENT COST

Site Name: ______________________

A EQUIPMENT NAME & DESCRIPTION	B. SERIAL &/OR MODEL #	C DATE PURCHASED OR ACQUIRED	D PURCHASE PRICE	E LEASE OR RENTAL PRICE

FORM 1.61

Home Service Schedule

Site ____________________

Staff Name ____________________

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		WEEKEND	
	Child ID	RT Miles	Child ID	RT Miles	Child ID	RT Miles	Child ID	RT Miles	Child ID	RT Miles	Child ID	RT Miles
WEEK 1												
WEEK 2												
WEEK 3												
WEEK 4												

FORM 1.62

Staff Reimbursements

____
Site

STAFF NAME	REIMBURSEMENT DATE	CHILD ID# OR PURPOSE OF TRIP	VOUCHER #

FORM 1.71

COST OF TELEPHONE

A. COST OF TELEPHONE SERVICE FOR PREVIOUS YEAR ____________________

B. COST OF TELEPHONE SERVICE FROM JULY 1 TO DATE ____________________

FORM 1.72

COST OF SUPPLIES

A. TOTAL EXPENDITURE FOR PREVIOUS YEAR ____________________

B. EXPENDITURES FROM JULY 1 TO DATE ____________________

DIRECTIONS FOR

FORM 1.81

FLOOR PLAN

The floor plan is used to allocate portions of a facility to specific program components. A professionally done floor plan may be used or a plan can be hand drawn. For a hand-drawn plan, use an 8-1/2 X 11 inch paper and draw a rough plan of the building or buildings in which the program operates. Include only those rooms used entirely by the program or shared with another program. DO NOT include facilities used entirely by another program. A sample floor plan that illustrates the type of detail needed is attached. Indicate the following information:

A. ROOM LABELS

Using a numbering system, label each room with a unique number. The first number of each room should use the following code:

1. administrative offices
2. classrooms
3. specialists therapy rooms (OT, PT, ST, testing)
4. bathrooms
5. storage areas
6. food service
7. conference rooms
8. multipurpose (gymnasium, auditorium)
9. staff offices
10. other

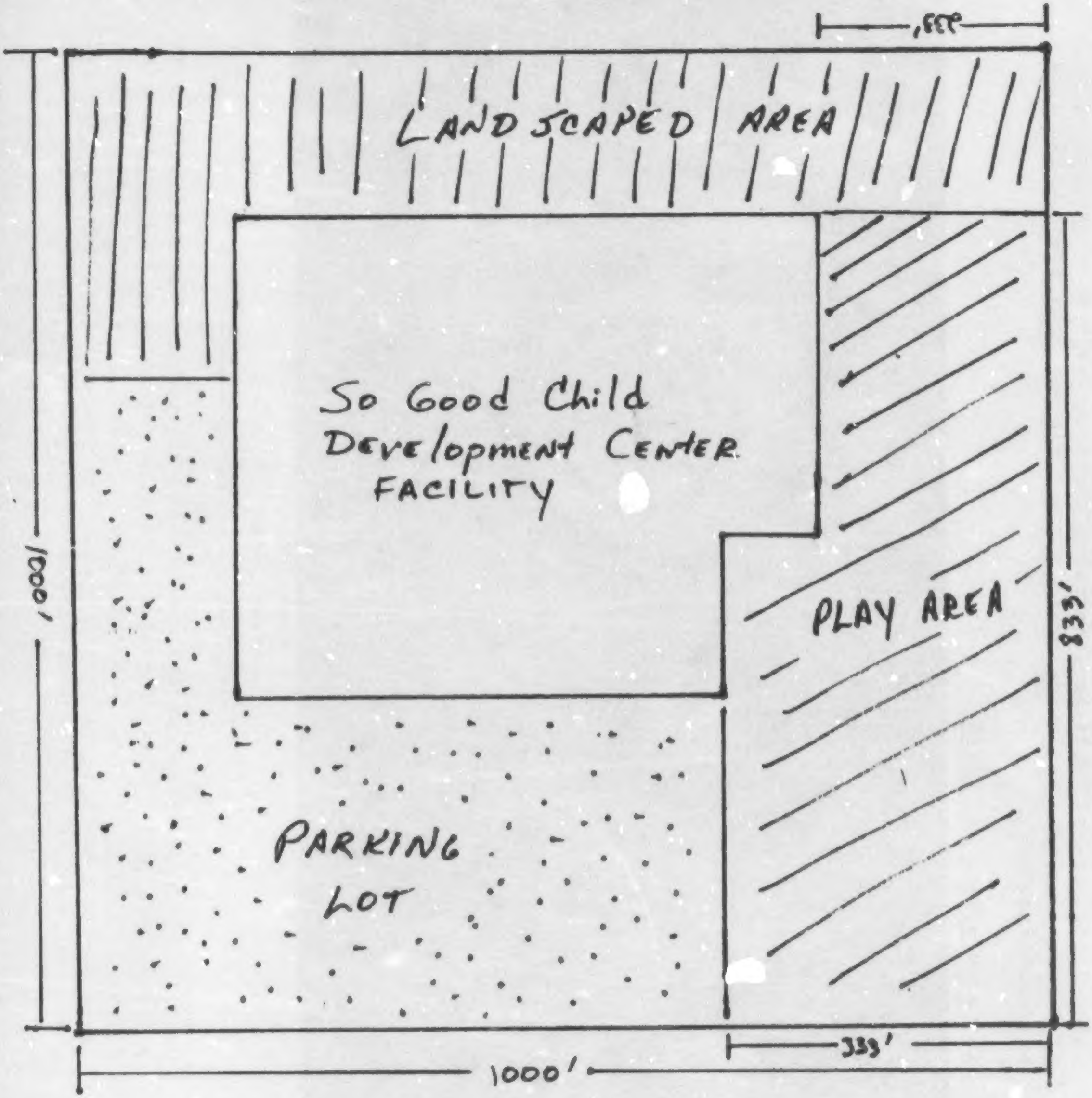
For example, three teacher offices could be labeled 90, 91, and 92. Eleven classrooms could be labeled 201 through 211.

B. DIMENSIONS

Indicate the size of each room by giving the approximate number of feet of the major walls. (See sample floor plan.) Also, show the overall dimensions of the total building (the major outside walls).

The land outside the facility which is used by the children (e.g., play areas) should be illustrated and labeled: show the overall dimensions of the outside space, the dimensions of each area of the outside space, and label each area by use. The outside areas may be illustrated on the same floor plan with the facility (FORM 1.81) or separately. A separate sample outside space illustration is included as an example.

Sample Plan of Building & Outside Area


333'
LANDSCAPED AREA
So Good Child Development Center FACILITY
PLAY AREA
PARKING LOT
1000'
833'
333'
1000'

DIRECTIONS FOR

FORM 1.82

ROOM SCHEDULE

One FORM 1.82 should be completed for each room used for direct intervention (direct intervention is defined as "child is physically in the presence of an instructor"). Usually, this will include classrooms and specialists' rooms. Multipurpose rooms used regularly by a particular group of children would also be included. Directions for completing FORM 1.82 are listed below:

A. ROOM NUMBER AND DATES:

Indicate the same room number as given on the floor plan. Give the dates when the room schedule is in effect. For example, if children are given direct intervention from September 12 to May 28, then those dates would be indicated. If the room is used for a summer program that is different from the regular program, two FORM 1.82 s should be filled out for the same room.

B. STAFF NAME

List each staff person who provides direct intervention to children in the room (aide, teacher, specialist, administrator).

C. TIME WHEN ROOM IS IN USE

For each staff, show the time of day when the room is being used for direct intervention. If one staff uses the same room twice, but not consecutively, list the name twice:

STAFF NAME	MON
Kris Jones	8-10
Kris Jones	3-4

Note: If all children use all the direct intervention space of a facility all the time (e.g., some programs operate in one large open area), do not complete FORM 1.82 as directed above. Rather, mark FORM 1.82 with a large "X" and write a brief note explaining how the intervention space is used. Be sure to specify which areas of the facility are included.

FORM 1.82

ROOM SCHEDULE

A. ROOM NUMBER ________ DATES WHEN SCHEDULE IS IN EFFECT: From ________ To ________

B	C. TIME WHEN ROOM IS IN USE						
STAFF NAME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY

FORM 1.83

COST OF FACILITY

Site: ______________________

Site Address: ______________________
____

A. Check one: The facility is: ☐ rented or leased, ☐ owned by program, ☐ contributed, ☐ other ____.
(specify)

B. If facility is rented, leased, or contributed, indicate the cost of the facility (excluding items in C below) for the past 12-month period: $______. If facility is owned, give purchase price $__________ and date of purchase ____________.

C. Indicate the cost of these items for the past 12 months: insurance, utilities, taxes, or other items.

ITEM	Cost for Item for Previous 12 Months	Indicate How Estimated Costs Were Derived
Utilities (specify which utilities) ______________ ______________ ______________		
Insurance (specify types of insurance) ______________ ______________ ______________		
Taxes (specify which) ______________ ______________ ______________		
Other (specify) ______________ ______________ ______________		

FORM 1.91

____
Site ID Number

CONTRIBUTION SCHEDULE
FAMILY SPECIFIC

A	B					C		D	E	F	G
	Estimated Hours/Month					Time Period					
ID# of Child	Instruction		Secretarial/ Clerical	Meetings	Other Service			Equipment Serial #	Materials/ Facilities	Money	Compensation Received
	Home	School				From	To				

FORM 1.92

Site ____________________

Home Space Costs/CONTRIBUTIONS

A. Specify: Average house size = ______________ sq ft
Average # bedrooms = ______________

B. Average rental = $___________/month, $____________/year

C. Average utilities = $___________/month, $___________/year

D. Source(s) of information for A-C

E. Utilities/year $_________ + Rent/year $__________ + Average # sq ft _________ + 8760 hrs = Cost/sq ft/hr $________________.

F	G			H	I	K
Child ID	# Hours/Week Used			Cost sq ft/hour x ______________	# sq ft x _____________	# weeks of program x ______________
	Program	Parent	Tot			
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
				=	=	=$
	Tot Hrs	Tot Hrs	Tot Hrs			$Total Cost Home
	X̄ Hrs	X̄ Hrs	X̄ Hrs			$ X̄ Cost Home

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FORM 1.93

____
Site ID Number

CONTRIBUTION SCHEDULE
GENERAL

A	B		C			D		E	F	G	H
	Instruction		Estimated Hours/Month			Time Period					
Name or ID #	Hours/Month	Specific Children	Secretarial/Clerical	Meetings	Other Service	From	To	Equipment Serial #	Materials/Facilities	Money	Compensation Received

Appendix 4-A

Brief Description of the SKI*HI Model

The SKI*HI Model contains three basic service components: Child identification, home visit services, ancillary services.

Child identification. Hearing impaired children are identified as close to birth as possible from high risk factors included on the Utah birth certificate. Audiological testing is then done to confirm suspected hearing impairment. Extensive public awareness campaigns and close referral cooperation with Utah medical and audiological personnel also ensures early identification.

Home visit services. Upon confirmation of the hearing loss, the child is fitted with amplification and the family receives weekly home visits from a parent advisor. This professional trains the family to provide maximal, effective auditory and language stimulation for the child in the home. This is done by first presenting the Home Hearing Aid Program. Parents are taught a series of lessons on such topics as how the hearing aid operates, care of the aid, appropriate selection and fitting of the aid, and ensuring the child's full-time use of amplification.

Parents also learn how to teach the child to use his amplified residual hearing. The Home Auditory Program enables parents to promote the listening capacity of the child, from awareness of loud environmental sounds to fine speech discriminations. Parents are taught a series of skill lessons in the Home Communication Program. They learn how to promote effective interaction between themselves and the hearing impaired child by establishing an effective home communication environment, establishing communicative contact with the child, and responding to the child's communication attempts by using effective verbal and non-verbal means. Parents are taught the Home Language Program which gives them the skills of consistent dialogue with the child in meaningful home situations, selection and increased use of target vocabulary, and reinforcement and expansion of the child's linguistic output. If total communication is the appropriate language system for the child, the SKI*HI Model includes a video-taped sign language program to teach families signs for use in the home.

Ancillary services. All children receive regular audiological evaluations to monitor their hearing losses. A bank of loaner aids is available, so several can be tried on each child to determine the most appropriate amplification system. In case of hearing aid break-down, loaner aids can also be used as immediate replacements.

Psychological supportive services are an important part of the SKI*HI Model. Parents of hearing impaired children attend parent group meetings where they receive information on topics of interest and share problems and gain new friendships with other parents of young hearing impaired children. Direct counseling for parents is available, and parent advisors consult with psychologists concerning immediate or potential psycho-social problems in the home.

All children and parents are assessed regularly on a wide number of skills and are staffed at intervals to determine appropriate programmatic directions.

Appendix 4-B

Teacher Rating: Compared to other students in class, how well does this child communicate? 0 = poor
5 = excellent

0 1 2 3 4 5 (circle one)

COMMUNICATION INVENTORY

There are four sections to this inventory.

(a) Section 1: how well the child responds verbally (or in sign) to your verbalized (or signed) input.

(b) Section 2: how well the child responds non-verbally to your verbalized (or signed) input.

(c) Section 3: how well the child responds verbally (or in sign) to your non-verbal input.

(d) Section 4: how well the child responds non-verbally to your non-verbal input.

There are 5 tasks in each area. All of the tasks are easily understood by hearing children 6+ years and older. If it is necessary to ask the question more than once, indicate how many times the question is repeated and circle that number by the question. Do not repeat the question more than 3 times.

Section 1 (Write down the child's response)

1. What is your name? ____________________
2. How old are you? ____________________
3. What grade are you in? ____________________
4. Where do you live? ____________________
5. What is your teacher's name? ____________________

Section 2 (If child responds correctly, just write down o.k. If not, write down child's response)

1. Please go to that chair (point to chair). ____________________
____
2. Please come back here. ____________________

3. Write your name in this square.

4. Please give me that book (glance to book). ____________________

____

5. Open it to page _____ (indicate page 1-20). ____________________

____

Section 3 (Write down child's response)

The man in these pictures is trying to let you know something. For example, here the man is letting you know that he is thinking or wondering about something (show trial plate I). Here the man is showing you "be quiet" (show trial plate II). What is the man letting you know in this picture (or what is the man in this picture feeling or showing you)?

1. Plate 1: ____________________
2. Plate 2: ____________________
3. Plate 3: ____________________
4. Plate 4: ____________________
5. Plate 5: ____________________

Section 4 (Ask the child to do what you show him/her to do. If child responds correctly, just write down o.k. If not, write down child's response)

1. Motion "come here". Response: ____________________
2. Motion "stop". Response: ____________________
3. Motion "turn around". Response: ____________________
4. Motion for child to go over to chair about five feet away.

____
(motion for child to return)

5. Ask the child to watch you and slowly count to 10. Before the child reaches 10, motion "sh, sh", (be quiet). Response: ______________

____

Tell the child he can finish counting and reinforce child for doing so.

SCORE BOX

A. Possible Points	B. Total # Points Scored	C. # of Repetitions	D. Total Score	# of Repetitions in C. which were on Items Scored "0"
40	________	- (___ x .5)	= ___	__________

Appendix 4-C

Project SKI*HI Outreach Parent Attitude Scale

Parent's Name ______________________

PROJECT SKI*HI OUTREACH

Parent Attitude Scale

Read each of the statements below and then rate them as follows on the answer sheet on pag[illegible].

SA	ma	md	SD
Strongly Agree	Mildly Agree	Mildly Disagree	Strongly Disagree

Indicate your opinion by blocking out the answer which most closely reflects your feeling. Remember if you strongly agree with the statement block out SA, if you mildly agree block out ma, if you mildly disagree block out md, or if you strongly disagree block out SD.

There are no right or wrong answers, so answer each statement in the way that reflects how you feel.

---

1. I feel a lot of people care about my child's development and are helping me.
2. I am confused with all the information I get about communication methods (oral, total communication).
3. I would prefer my child not wearing hearing aids in public so others would not know of his/her handicap.
4. I treat my hearing impaired child essentially the same as my other children.
5. I am confused about what others say is or will be best for my child, e.g., where he/she should go to school, if special therapy is advisable, what groups my child should join.
6. I don't know how to treat my child now that I know he/she is hearing impaired.
7. I am discouraged about the fact that my child is hearing impaired.
8. Our child's hearing loss has been no serious problem to us.
9. I think my child hears much better than most others think he/she does.
10. I find myself feeling angry about the situation of having a hearing impaired child.
11. I try my best each day and don't worry beyond that too much.
12. To avoid embarrassment at family and friend social occasions, (questions, stares, child's behaviors), I stay home now more than before.
13. In spite of bad days, I feel I can succeed with my hearing impaired child if I persist.
14. I often feel guilty about what I'm not doing to help my hearing impaired child.
15. I do not understand very well what professionals like me to do in the home to help my child.
16. I am often depressed because I really don't have the time or inclination to handle a hard of hearing child.

17. I am desirous for my child to become a productive citizen.

18. Because my child will need to function in a "hearing world", I would prefer he/she did not have any hearing impaired friends.

19. I feel frustration and disappointment because my child can't understand me.

20. I am embarrassed when strangers in public places notice my child is hearing impaired.

21. I regret that it is basically my fault that my child is hearing handicapped.

22. I get more confused the more I hear about deafness.

23. I often question if my child is receiving the best educational program or therapy.

24. I find myself hoping my child's hearing will return even though I've been advised otherwise.

25. I am angry with the doctor(s) who told me of my child's hearing problem because the diagnosis took too long or was misleading.

26. When other people seem to be embarrassed with my hearing impaired child, that affects me in a negative way.

27. I often worry about my child ever being able to be on his/her own.

28. I am looking forward to the raising of my hearing impaired child as a good, important experience.

29. I get embarrassed when the hearing aid squeals at inopportune times.

30. I remove the hearing aid from my child (or ask my child to remove the aid) when he/she plays rough for fear of damaging the aid.

31. I feel confident as a parent with a handicapped child.

32. It is very likely that God is punishing me by giving me a child with a hearing loss.

33. I am upset because it seems we are being, or were, forced into a method of communication (oral, total communication) for my child.

34. I take time for myself even though it is hard to come by.

35. I find myself often feeling fearful for my hearing impaired child's safety.

36. Life would be much happier if I did not have to cope with the situation of having a hearing impaired child.

37. I frequently get angry about the problems of keeping a good hearing aid constantly on my child.

38. I am discouraged because most professionals seem at a loss to help much.

4-C.4

PROJECT SKI*HI PARENT ATTITUDE SCALE ANSWER SHEET

Name____________________ Address______________________________

Child's Name____________

Date____________________

1. SA ma md SD
2. SA ma md SD
3. SA ma md SD
4. SA ma md SD
5. SA ma md SD
6. SA ma md SD
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33. SA ma md SD
34. SA ma md SD
35. SA ma md SD
36. SA ma md SD
37. SA ma md SD
38. SA ma md SD

Appendix 4-D

Parent Questionnaire

____________________ 4-D.2

Child's Name
(to be filled in by USU)

PARENT QUESTIONNAIRE

Background Information

1. School child is currently attending ____________________
(Name of School)
____
(Town) (State)

2. Child is in
____ oral classroom
____ total communication classroom
____ public school classroom (mainstreamed)
____ other

3. Number of brothers and sisters in the home: ____

4. Number of parents in the home: ____

5. Hearing status of parent(s):
____ hearing
____ hearing impaired
____ one parent hearing, one hearing impaired

6. Occupation of father ____________________
mother ____________________

7. Educational level of:
(Check highest one completed)

	Mother	Father
Less than high school		
High school graduate		
College graduate		
Masters		
Doctorate		

8. Age of father ____
mother ____

9. Did your child attend a preschool program? ____ Yes ____ No

If yes, was the preschool:
____ for hearing impaired - oral
____ for hearing impaired - total communication
____ hearing
____ other

10. Does your child have handicaps other than the hearing impairment?
____ Yes ____ No

If yes, what type(s) of handicaps:
____ physical
____ perceptual (vision)
____ mental
____ emotional
____ other

Questions About Hearing Impaired Child

1. During an average day, what percent of the child's waking hours is the hearing aid worn?

____ 0 - 25%
____ 26 - 50%
____ 51 - 75%
____ 76 - 100%

2. Is your child receiving therapy in addition to school (therapy not part of regular school day)? ____ Yes ____ No

If yes, which of the following types of therapy?	How many times each week?	Length of each session
____ speech	____	____
____ academic (reading, writing, etc.)	____	____
____ other	____	____

3. During an average day, how long does your child study or read (school books or pleasure reading) outside of school?

____ 0 - 30 min.
____ 30 min. - 1 hr.
____ 1 - 2 hrs.
____ more than 2 hrs.

4. During an average day, what percent of your child's play is

____ alone
____ with friends
____ with brothers and sisters

(should total 100%)

5. How many friends does your child associate with regularly? ____

6. Would you consider your child's attitude towards school to be

____ better than most (very excited about school)
____ average (goes to school)
____ worse than most (very unenthused about school--may resist)

7. In your estimation, what percent of your child's communication is completely intelligible (understandable) by:

	Family members	Non-family
100%		
75 - 99%		
50 - 74%		
25 - 49%		

8. Approximately how many middle ear infections has your child had during his/her life?

No. of infections:	0 - 3 yrs.	4 - 7 yrs.	8 - 11 yrs.	12-15 yrs.
0 - 1				
2 - 3				
4 - 5				
6 or more				

9. During an average day, how much time do you spend communicating with your hearing impaired child?

____ 0 - 30 min.
____ 30 min. - 1 hr.
____ 1 - 2 hrs.
____ more than 2 hrs.

10. Do you consider your child's behavior to be

____ problem behavior (inappropriate for child's age)
____ average for child's age
____ better than average (for child's age)

Appendix 4-E

Development of New Measures

DEVELOPMENT OF NEW MEASURES

Communication Inventory. A hearing impaired child's communication abilities (especially non-verbal) may not be accurately ascertained in formal language measures. Therefore, an inventory was developed to assess the child's ability to respond verbally and non-verbally to verbal and non-verbal messages required in daily living. The Communicative Abilities In Daily Living Inventory (Holland, 1980) was used in the construction of the inventory.

The inventory was field tested on 15 hearing impaired children ages 6 - 13. Instruction clarification, content, and scoring revisions were made on the inventory as a result of this field test.

Then the inventory was field tested on 16 hearing impaired children ages 6 - 13 at the Idaho Scool for the Deaf. Teachers were also asked to rate the child's communicative abilities (when compared to other students in the classroom) on a scale from 0 - 5 (0 being poorest, 5 being the best).

The scores on the communication inventory were correlated with the teacher ratings and yielded a Pearson Product Moment Correlation coefficient of .67. Feedback from the hearing impaired children led to final instructions content, and scoring revisions.

Parent Questionnaire. A parent questionnaire was written which contained outcome variable items, such as percent time hearing aid worn, percent of family and non-family communication understood by child, percent child communication understood by family and non-family, rating of child behavior in home, and rating of child attitude toward school.

In addition, factors that could possibly confound the treatment effects were obtained, such as educational level and occupation of parents, age of parents, number of siblings, and number of child middle ear infections.

The first draft of the questionnaire was sent to 20 parents of hearing impaired children. They noted if questions were ambiguous and offered suggestions for clarification. The appropriateness of their responses to the questions also revealed question ambiguity. Final revisions were made accordingly.

Parent Attitude Scale. A first draft of the scale was given in interview form to 15 parents of hearing impaired children. Parents were asked if they had any questions understanding the items and if they would rather not be asked the questions. They were also asked to explain their responses to the questions (to determine if their answers were consistent with the questions and if not, why the questions were misunderstood). As a result of this phase of the field test, several wording revisions were made, and a few questions were deleted.

Next, 6 professionals who work with the SKI*HI Model were asked to rate the relationship of SKI*HI intervention impact to the attitudinal items. As a result of this, a few items somewhat remotely related to intervention were also dropped.

Rational sub-categories were then selected for the remaining items so sub-scores could be obtained. The categories were:

(a) reactions to outside help,
(b) anxiety/guilt, and
(c) acceptance of the hearing impairment.

The parent attitude scale was then sent to parents of children in this study. After the scales were returned, a factor analysis was performed to see if more appropriate sub-categories could be obtained for scoring. The factor analysis yielded 13 factors. Parent attitude items that were loaded highly and predominantly on one factor were then grouped by factor.

Only one factor had more than three items. Only three or four of the thirteen factors could be appropriately labeled to subsume all items.

Since the factor analysis did not yield successful sub-categories, an analysis was done on the rational sub-categories. Each item within a logical sub-category was correlated with the other items in that category. Six items had low sub-category correlation coefficients (< .2) and were subsequently deleted from the scale. The remaining 32 items in the three rational sub-categories were then used for this study.

Appendix 4-F

Training Agenda

4-F.2

TRAINING AGENDA

Thursday, March 17

9:00 - 9:45	Introduction Explanation of EIRI Explanation of Longitudinal Study (Dr. Karl White and Sue Watkins)
9:45 - 10:30	Communication Inventory (Sue Watkins)
10:30 - 10:45	Break
10:45 - 11:15	Communication Inventory Practicum
11:15 - 12:00	Kendall-Meadow Social Emotional Inventory (Sue Watkins, Program Administrator, Department of Communicative Disorders)
12:00 - 1:00	Lunch
1:00 - 1:30	Kendall-Meadow Continue
1:30 - 4:30	Woodcock-Johnson (Dennis Clarkston, Doctoral Student, Special Education Department)

Friday, March 18

9:00 - 10:30	Peabody Picture Vocab. (explanation) (Sue Watkins)
10:30 - 10:45	Break
10:45 - 11:45	Peabody Practicum
11:45 - 1:00	Lunch
1:00 - 2:30	Gardner Test and Practicum (Sue Watkins)
2:30 - 4:30	Travel/Schedules

Tuesday, March 22

8:30 - 12:00	Carrow Test for Auditory Comprehension of Language and Developmental Sentence Scoring (Carol Strong, Assistant Professor, Department of Communicative Disorders)
12:00 - 1:00	Lunch
1:00 - 2:00	Arizona Articulation Proficiency Test (Carol Strong)
2:00 - 4:00	Filming Arizona and Language Samples (Bob Lake, Director of Media, Exceptional Child Center)
4:00 - 5:00	Finalize schedules - Travel arrangements (Sue Watkins)